Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone and Sound Waves

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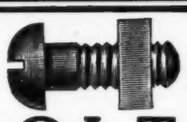

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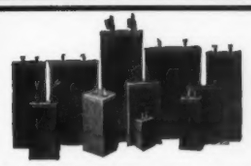

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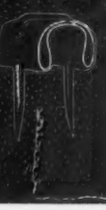

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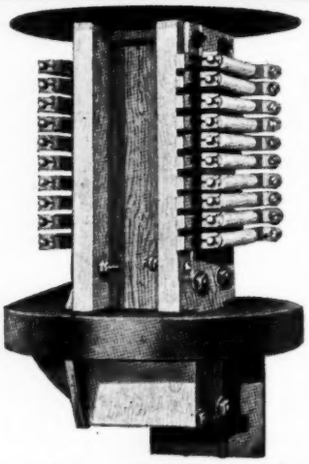

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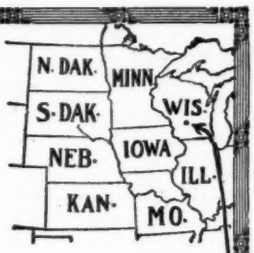

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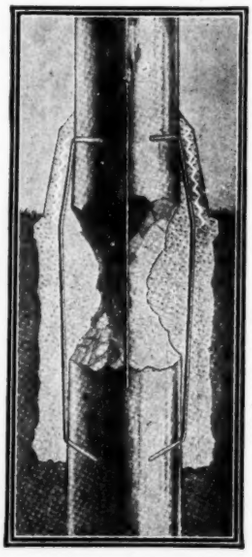

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Steel Wage Increase a Happy Omen.

The dispatch from Pittsburgh, here reproduced, showing the increase of 10 per cent. in wages announced by the Jones & Laughlin Steel Co., one of the principal independent steel manufacturers of the country, affords one of the strongest evidences of both present and future prosperity. Beyond a shadow of a doubt the steel company is now enjoying a period of exceptional expansion, else it would not consider the increase just announced. When business booms the steel companies raise wages; when business declines, the wage earner is among the first to suffer. If the steel business is feeling the impetus of big, profitable business, the railroads are also prosperous; if the steel business and the railroads are both making money, the commercial world as a whole, is out of the doldrums. When the telephone business can increase its net profits in the face of hard times like those of 1907 and 1908, it assuredly confronts a bright prospect when business generally is sound.

Public Service Commission Powers.

Great interest will be felt in the decision of a case recently carried to the Supreme Court of Massachusetts by the Fall River Gas Works Co., which involves the powers of the Gas Commission of the state to impose limitations upon the issue of additional stock by a public service corporation, says the Wall Street Journal. In this case the company asked permission to issue 1,050 shares of new stock to meet specific and, admittedly, legitimate expenditures. The commission withheld its consent on the ground that the company's net earnings over and above the customary 10 per cent. or 12 per cent. dividends on the stock were ample to provide all the funds necessary. This ruling has been appealed.

It will of course be recognized that the laws creating public service commissions vary in different states, and that the powers conferred in Massachusetts may be greater or less than those in other states, but the question is none the less interesting as laying down a general principle covering the powers of commissions with regard to security issues. It is admitted that the physical value of the property in question is considerably in excess of the outstanding securities, that the new money would go into actual improvements which would become part of the assets, and that the earning power of the company would be ample to keep up regular dividends on the increased capitalization. It seems then that the decision of the commission was based on a question of financial policy rather than on the safeguarding of the investor.

Whether the issue of new stock or the use of surplus earnings is the better policy, has nothing to do with the

DISPATCH INDICATING THE RISING TIDE OF PROSPERITY IN STEEL.

PITTSBURGH, July 15.—It was announced today by the Jones & Laughlin Steel Co., the largest competitors of the United States Steel Corporation in this country, that an increase of 10 per cent. had been granted to all employes who work by the day or hour system of pay. The increase directly affects 6,000 employes.

The volume of steel business now is the largest in the history of the country, and there is every indication it will continue to grow, financial men believe. The steel trade is an excellent indicator of general trade conditions, which increase when steel booms and fall off when steel drops.

An official of the Jones company said: "This increase of the company affects all laborers paid on the hourly basis and includes several thousand men. Day labor is advanced to 17½ cents an hour. The increase is made effective today because this is the first day in the week's pay."

No specific reason for the increase was announced by the company, but the scarcity of labor and the large amount of work for the men are believed to be the principal factors. The increase announced by the Jones & Laughlin Steel Co. does not affect the tonnage men. It is believed that other plants will follow.

present proposition. Has any commission a constitutional right to go further in its paternalism than to safeguard the interests of the public? Has it a right to dictate the financial policy of a corporation, after undoubted proof that both the holders of the old securities and the buyers of the new are protected? If this company had not a large excess of earnings every year, there would have been no reason for vetoing its proposed financial scheme. Is the fact that it could provide funds in other ways a valid ground?

No one in this day denies the value to the investing public of investigation and regulation by properly constituted commissions. It is to be hoped that through their scrutiny and care the period of over-capitalization and inflation in utility companies has passed, and that buyers of securities can feel reasonable safety. But it is a question whether commission powers should go beyond the protection of the public, expanding from useful regulation to actual management. Should not stockholders be allowed to retain the control of their property?

The decision in the Massachusetts case may only interpret the law of that state, but it is to be hoped it will go further and give us some insight into the legal aspect of the broader principle.

The Long Distance Habit.

Some telephone subscribers have the habit of using long distance service to only one or two points and the mails to other equally important points. It is simply a habit which the subscriber may be readily prevailed upon to break if his attention is called to it.

When you find a subscriber using your long distance service to but one or two points, suggest to him that, if he found the service economical in saving a trip of ten miles, it will be proportionately useful in saving one of fifty or a hundred. You will find him a far more easy prospect for business than the man who has never learned the benefit and the actual saving to him of the use of the long distance lines.

Government to Strengthen Anti-Trust Safeguards.

Advance information declares that the Stanley steel investigating committee, a body composed of close and thoughtful students of the commercial life of the country drawn from both houses of congress, will shortly report definitely and emphatically in favor of competition as against a monopoly in the steel industry, and will recommend changes in the anti-trust law to make its recommendations effective. The general principles to be laid down by the committee are applicable to every monopoly, or attempted monopoly, in every line.

Under the proposed amendments those injured by a trust may proceed against it directly in the equity courts for damages or relief, without waiting for the attorney general to take action under the Sherman law. In case an action by the government has been successfully prosecuted, claimants for damages against the trust are not to be required to re-establish the case adjudicated against the trust, which latter is estopped from challenging such testimony and proof.

It is apparent, therefore, that the policy of the government favoring competition as against monopoly is not only to be upheld, but strengthened by affording additional means of redress to injured business enterprises. It is not doubted that the recommendations of the Stanley committee will be enacted into law.

Lightning Protection.

For the protection of electrical equipment against lightning, the air gap type of lightning arrester is commonly used in telephone work. In its simplest form it consists in placing between the two line conductors, a third conductor material, which is connected to the ground. There is a very small air gap between this conductor and line conductor, so that lightning can readily break down the resistance of the air and find a path of low resistance to the ground.

Various materials have been used for the conducting sections at the point where the air gap is located. Carbon is the most common as it does not fuse. This permits an extremely small air gap between the line carbons and the ground carbon. The chief objection to the use of carbon blocks is that dust, which is formed during the lightning discharges, settles between the carbon blocks and grounds the telephone line. On farm lines where the instruments are at some distance from the exchange this grounding causes considerable trouble both for the company and the subscriber.

To overcome this difficulty, some manufacturers treat the surfaces of the blocks with a special preparation, which tends to prevent the formation of dust during a lightning discharge. In other types of arresters, the shape of the carbons has been changed so as to present a series of points or knife edges at the surfaces where the discharge takes place.

Copper blocks are also used in arresters. On account of the liability of copper to fuse when a heavy discharge takes place, the air gap is considerably wider than in an arrester which uses carbon.

Some telephone companies now use inductance coils in connection with the air gap type of arrester. The coils are placed in series in the line between the arrester and the telephone instruments. They have but little appreciable effect on the passage of voice currents, but greatly impede the passage of the high frequency lightning discharges. The lightning thus being forced or choked back, jumps across the air gap and thence to ground.

Another form of arrester encloses the air gap in a vacuum and thus obtains a gap sufficiently wide to prevent the danger of the arc fusing the blocks or of dust settling between them.

In line with the improvements made in lightning arresters, advances have also been made in the equipment of telephone sets, which render them less liable to damage from lightning discharges. The ringer coils are seldom burned out now in comparison with the number which were damaged by lightning discharges a few years ago. The generators and receivers have also been improved by use of better insulated wire, which, in connection with improved methods of manufacture, renders them less liable to damage.

The Selection and Training of Telephone Operators

The Traffic in the Spring Exchange, New York City—An Operators' School of the New York Telephone Co. —Qualifications for an Operator—Methods of the New England Telephone & Telegraph Co. in Selecting and Preparing Operators for their work

The Spring telephone exchange of the New York Telephone Co. is one of the units in the telephone system of Greater New York and is similar to the other 64 telephone exchanges serving New York City subscribers in a similar way in all sections of the city. This exchange contains one of the latest type multiple switchboards with 82 "A" positions and 40 "B" positions.

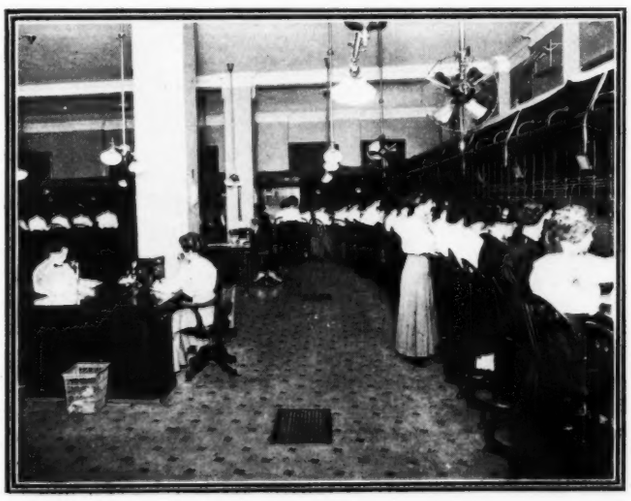
The telephone traffic of New York City exceeds on an average 2,000,000 originating calls per day. Of this number, approximately 83,000 originating calls are handled in the Spring exchange. There are also 86,500 incoming calls per day, making a total of 169,300 calls, which are handled in this exchange in one day.

The exchange serves an area of approximately .83 of a square mile. There are 7,330 subscribers served directly by the exchange with a total of 15,400 telephones. The operating force necessary to handle the traffic in this district consists of 212 employes, divided as follows: 169 day, 27 evening and 16 night.

In connection with the Spring exchange, is an information bureau which serves seven central office districts. This work requires 69 operators in addition to the number previously mentioned.

In no other division of public service are systematic work and exactness of operation more essential than in telephony. New workers must be thoroughly trained and developed. They must know why and how everything is done, in order to be prepared in advance to meet all of the difficulties encountered by the myriad phases of sensitive apparatus and sensitive human nature. To provide for this important feature of successful telephone operating, schools for telephone operators in different localities have been established where actual and practical methods are taught.

An operators' school is located in the same building



"A" Board Spring Exchange, New York.

with this exchange and is maintained for the instruction of operators. Its object is to fill vacancies in the company's force, occasioned by resignation and to meet the growth of business. Applicants to the school are interviewed and are expected to qualify in all the following points: A good common school education; an active, intelligent mind; good eyesight and hearing; an apparently good physique; a general neat and orderly appearance; penmanship, free and neat, and spelling correct; an ability to read simple prose clearly, accurately and with evidence of an intelligent comprehension of the subject matter.

A course of instruction of four weeks is given to successful applicants, who are paid $5 per week while receiving instruction. This course consists of lectures, class work and practice at the switchboard. From time to time, there are general reviews of the subjects that have been treated and the students are required to pass examinations proving their familiarity with the ground covered.

Waiting to File Applications at the Telephone School.

The students in the school are divided into classes. Those who enter each Monday constitute the lowest class, and they advance from class to class until the course of instruction is completed. They are then graduated and passed as competent to be placed in a central office.

A description of the Boston school for operators of the New England Telephone & Telegraph Co. and its exact course of training was recently published in the New England Telephone Topics. This school occupies the fifth floor of the company's office building in Oliver Street. The school suite comprises the following rooms: Application room, physical examination room, study room, lecture room, operating room, dining room, kitchen, and the private offices of the school principal and the physician.

In the application room applicants are received each week day, except Saturday, between 2:30 and 3:30 p. m. Each applicant is required to make out a regular form of application after which she is sent to the physical examination room where she is measured for her sitting height, arm reach, and her weight is taken. The sitting height is an important factor in the selection of an applicant. Many young women who appear short in stature, are equal to others in sitting height. It is the sitting height, not the standing height, which is the factor of value in telephone operators because it makes up the "reach" that is required at the switchboard.

The applicant is then examined by the school principal, Miss M. E. Harrington, who, by the way, has been in charge of the school since its organization in January, 1906. She has had a wide experience in telephone work, and was promoted from the position of chief operator to

this important position in the school because of her knowledge of operating, her natural ability to teach and direct and her wise and tactful judgment in selecting the fit from the unfit.

The examination by the principal determines the age, education, natural intelligence, quickness of thought and action, quality of voice, and general disposition with special reference to patience and courtesy.

The physical examination of the applicant is only general in its nature. Dr. Anna G. Richardson who has a high standing in the medical profession, is in charge of this important branch of the school.

All statistics brought together by these examinations are entered upon the application blank which is marked A, B, C or rejected, depending upon the applicant's qualifications. An accepted applicant must be at least a grammar school graduate; preference is, of course, shown those whose education has been more extensive. In age she must be between 17 and 25 years. She must have an arm stretch of at least five feet and a sitting height of 33 inches.

Good health must be possessed, natural intelligence, quickness in thought and action, and a disposition to be invariably courteous and patient. In the matter of health, she must in particular have steady nerves, good eyesight and unimpaired hearing. Rejected applicants are advised of the fact and the reason at the time of examination. References given by the accepted applicant are immediately written to, and if favorable replies are received the applicant is requested to report at the school usually the following Monday.

On reporting to the school, the applicant is enrolled as a student and assigned a locker, towel, individual drinking cup and a telephone set. She is informed of the school hours which are from 9 a. m., to 5 p. m., except on Saturdays, when the closing hour is 1 p. m., and she is assigned a seat in the study room.

The adjustable, sanitary steel desks with which the room is equipped, are considered superior to any in use in the Boston public schools. This room is used for periods of study between the lecture courses and the actual operating practice at the switchboard in the operating room. An instructor is in charge and it is she who is available to assign the lessons, conduct the examinations and answer questions.

The switchboard room very closely resembles the operating room of a real central office with its line of working switchboard, its monitors' equipment and chief operator's desk. It is only six or seven years ago, that telephone operators learned their vocation by sitting at an exchange switchboard alongside of experienced girls, "observing," and getting what additional instruction they could by asking questions. As soon as the candidate was believed to have absorbed a working knowledge of her duties, she was assigned to a position at the board where the traffic was light, there to finish her education in the "school of practical experience" under the guidance of an older operator. Three bad features appeared in this practice. It made the public take a considerable part in the girl's training and suffer the incidental annoyances and discomforts; it was almost certain to perpetuate the individual faults of the operators who furnished the object lessons without necessarily inculcating their virtues; and its influence was not in the direction of uniformity of method. Later an unused section of the switchboard was set aside for instructing these student operators, the instruction being given by an experienced operator. But the part of the apparatus used for practice was not connected with any working lines and all that could be taught was a certain deftness in handling the equipment, which, while important, is by no means the most necessary qualification.

Today an up-to-date switchboard is connected with an instructor's desk. The instructors represent the public and in passing calls to the new workers at the practice switchboard, they imitate the public, reproducing as far as possible all the vagaries in passing calls. The instructors at the switchboard see that the rules are applied properly

The Company Furnishes Appetizing Lunches.

in each situation. If the candidate is temperamentally unfitted for the work, such a course of training will disclose it in time for her to withdraw without embarrassment to herself or the company before she has put the public to annoyance or inconvenience. On the other hand if she is suited to the work, she will go into the exchange thoroughly prepared to meet any ordinary emergency.

The switchboard consists of 24 "A" and 2 "B" positions. There are 840 line jacks scattered through the total multiple installed of 2,100. Dummy multiple is in separate strips and comprises the sleeve only. The last six "A" positions are equipped for 100 per cent trunking with ancillary answering jacks. Each "A" position is equipped with 100 answering jacks, with but 10 wired for use. The trunk multiple consists of 280 available trunk jacks. Each "A" position is equipped with six subscribers' cord circuits, one being arranged with coin collection keys. One of the "B" positions is equipped with 25 single cord circuits for operation from relay offices, and the second with 23 circuits of the same type and four cord circuits from "Toll" for switching. The usual flash and busy strips are provided.

The equipment of the instructors is of new design and different from that in use in any other company. It consists of a desk comprising four sections of two positions each. Each position is equipped with 30 keys mounted in single row, which are arranged for use as follows: Thrown away from the operator, to operate any line signal to which it may be cross wired, and to cut in the instructor telephone set. Ten lines terminate on the positions of each of the three operators instructed from a particular position of the instructor's board. With key thrown toward the instructor, her telephone set is removed, and in that position gives the talking signal to the "A" operator.

Thirty single cord circuits mounted in single row are located in proximity with the 30 keys. These cords are used in answering the calls coming back on the instructor's desk, which she has originated, on the associated keys. A strip of call circuit keys is installed, containing the "operators' heads" of her instruction division. A key is installed which connects with the instructor's associated monitor on the floor, placing the monitor in direct telephone communication with the desk instructor and at the same time remov-

ing the student's set from the circuit. By depressing a call circuit button on any position, the instructor at the board may signal her associated desk instructor in on the instruction circuit.

Each section of the instructors' equipment consists of a six-panel turret, three panels comprising the receiving equipment for use of each instructor. This equipment consists of 30 jacks arranged as incoming ring down lines, and installed 10 per panel with designation strips. A pilot signal placed in the turret indicates whenever an operator rings on the tip side of a divided ringing line. This ring down apparatus is arranged for crosswiring to any multiple jack desired.

An equipment of 60 jacks arranged 10 per panel is installed in each section which is wired as a multiple of each "B" cord circuit. Busy signals mounted 10 per strip, are placed above the jack strips, which remain lighted on each section for the interval that an "A" operator's plug is inserted in the corresponding trunk multiple jack, designating to the instructors that that particular trunk circuit is in use. Designation strips are placed beneath each jack strip. This equipment allows for the operation of the "B" equipment by the instructors during periods when it is not desired to cover the "B" positions.

In conjunction with the switchboard training, instruction is also given by a course of lectures and by the use of graphic charts in the lecture room.

This instruction course embraces first the organization and the functions and importance of the different officials and departments for the purpose of administration and operation. Next the general rules governing the conduct of operators in their relations to the public and to their superiors in office and to each other.

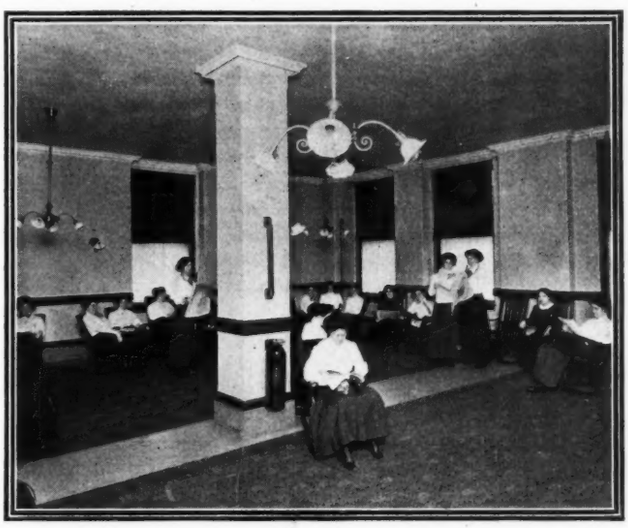
By the use of telephone apparatus with all its interior parts exposed and graphic charts depicting on a large scale the details of the minute parts of this apparatus, the student is taught the construction of the telephone instrument, the switchboard and its central office auxiliary equipment. The whole make up of an operating position at the board is shown and explained, and just what happens in every part of the plant from the time one subscriber who wants to reach another, lifts his receiver off its hook, through

Practice Switchboard in New York Operator's School.

the process of answering his signal, taking his order, calling the number wanted, reporting busy lines, and don't answers, etc., to the moment that he hangs up and signals that he is through talking.

All this is told in the lecture course until the student understands the mysterious, intricate process under her control and is able to detect instantly the slightest sign of anything going wrong.

The operating practice or rules for handling all classes of calls, must be thoroughly learned and applied with exactness. The phraseology of this practice which has been adopted after years of intelligent study has recently been



Retiring Room for Operators, Spring Exchange.

made uniform throughout all the companies in the United States which make up the Bell system. It is skillfully worded so as to meet all operating situations with the brevity and clearness of meaning necessary to the speed of service demanded today by the public.

The lecture course includes instruction in the different classes of subscriber's service and the privileges to which each class entitles the subscriber; the method of handling the business from automatic pay stations and "prepayment" subscribers' service, involving the deposit of coins and the detecting of the signals that the proper coin deposits have been made; the metering of calls from measured service subscribers' stations and pay stations; and finally a course in handling toll and long distance calls. As a part of the course of instruction, parties of students are sent to different exchanges for the purpose of observing the business atmosphere, the discipline, and to absorb, in a general way, that which will be required of them when they are assigned to the exchange for real duty.

The entire school course occupies a period of four weeks, the training itself consuming three weeks and two days and the remainder of the time being devoted to reviews and special coaching in any features demanding it. During the course, a daily report of each student is kept by the instructors, showing the grade of her work at the switchboard and in class. At the end of the week, this report is summarized and the average grade of work of each student is noted on an individual card record. From this the principal is able to obtain an idea of the progress of the student and to specially investigate any case needing attention.

On Saturday of the fourth week, all students successfully completing the course are graduated and are sent out to exchanges near their homes to report for duty the following Monday. At the same time an envelope, known as the "Employe's Service Record," containing the student's application blank, replies to her references and a report of her ability and work at the school, is sent to the chief operator at the exchange to which she is assigned. This record is of special benefit to the chief operator, as it gives her a knowledge of the ability of the student and the fea-

tures in her training that need further attention and development.

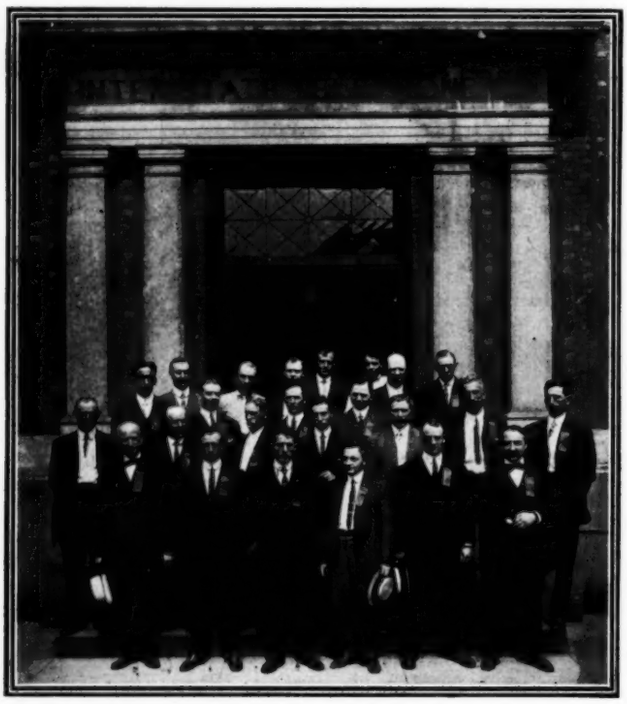
The company has always been able to secure a picked student force without advertising, and most of these young women have had either some high school or academy training. Out of 963 enrolled students last year 82 per cent had received more than a grammar school education and 18 per cent. were graduates of high, academy or commercial schools.

Postal Telegraph Companies Consolidate.

Stockholders of the Postal Telegraph & Cable Co. No. 1, the Postal Telegraph & Cable Co. No. 2, the Postal Telegraph & Cable Co. No. 3 and the Postal Telegraph & Cable Co. of Pennsylvania have unanimously voted to consolidate all the individual companies into one, the Postal Telegraph & Cable Co., Pennsylvania.

The Delegates to the New Jersey Convention.

At the second annual convention of the New Jersey State Telephone Association, just held at Trenton, N. J., which was briefly reported last week, several new companies became members of the association, which looks forward to a year of great promise. The accompanying photograph was taken as some of the delegates were gathered on the steps of the Interstate Telephone & Telegraph Company's building. It is probable that the next meeting will be held at Atlantic City, although that point has not been definitely decided.



Some of Those Who Attended the New Jersey Convention.

Michigan Commission Considers Detroit Merger.

The state railroad commission took under consideration this week a petition asking permission for the Michigan State Telephone Co. to merge with the Home Telephone Co. of Michigan, of Detroit, and its subsidiary, the Inter-State Long Distance company. The hearing was held at Lansing, where representatives of forty Independent companies appeared to protest against the proposed merger.

The petition was presented by Judge James O. Murfin and John A. Russell, of Detroit, the former representing the Michigan State Telephone Co. and the latter the Home Telephone Co. of Michigan. The merger plans take the form of an outright purchase by the Michigan State company of the property of the Detroit Home, the sums involved aggregating nearly $4,000,000. The petition simply cited the fact that such contracts have been entered into, copies of the contracts being attached, which are to become operative only with the consent of the commission and under the conditions imposed by it.

The Independent telephone system is composed of the group of properties constructed and operated by St. Louis and Michigan capitalists within the past six years in Detroit and the adjoining territory. Primarily these properties include the plant of the Home company, which has operated a telephone system in Detroit for several years, covering not only the entire city, but the adjacent villages of Highland Park, Hamtramch, St. Clair Heights, Grosse Point and Grosse Point farms and the townships adjacent to the city and these villages. There are five exchanges. They also include the property of the Inter-State Long Distance Telephone Co., owning extensive properties in Wayne, Washtenaw, Macomb, Oakland, Livingston, Ingham and Monroe counties, as well as interests in other local telephone companies.

Among the local exchanges directly operated by this company, in addition to stations on its toll lines, are those at Northville, South Lyon and Howell. The sale also includes the property of the Detroit River Telephone Co., operating the Wyandotte and Trenton exchanges and one at Flat Rock, covering the surrounding townships.

The purchase of the Home company and its controlled properties is said to be part of a general movement toward the unification of the telephone facilities of Michigan. The Michigan State has already acquired the Swaverly system in the Traverse Bay district, and a petition for authority to purchase the Washtenaw County Telephone Company's property for $118,000 is now before the commission for consideration. The Southern Michigan Telephone Co., operating in Hillsdale and Branch counties, has purchased the Bell company's property in its territory. The Bell and Independent interests in Lenawee county have combined into a single corporation as the Lenawee County Telephone Co., and negotiations are said to have been in progress for some months with the Citizens' Telephone Co., of Grand Rapids, looking to the acquisition by that company of the Bell properties in Grand Rapids and the purchase by the Michigan State of the Independent exchanges of the Citizens' company in other places in western Michigan. Some overtures have also been made respecting the Valley Telephone Co., of Saginaw, but these have not progressed very far.

James O. Murfin, former Wayne circuit judge who consummated the big deal, said recently: "There will be no increase in rates. Many, anticipating consolidation, have feared this, but there is not the slightest ground for apprehension. There will be no disturbance of existing contracts. I presume that 30 days would suffice in which to put the acquired property into operation as part of the Michigan State company's system."

Interstate, of Aurora, Out of Receivership.

Reorganization of the Interstate Independent Telephone & Telegraph Co., of Aurora, Ill., operating local and long distance lines throughout Illinois, was practically effected this week by the entry of an order by United States Judge C. C. Kohlsaat ordering the property of the company to revert to the corporation from the receivers. A certified check for $175,000 to pay the indebtedness incurred by the receivers was turned over to the court previous to the issuance of the order.

The concern was placed in the hands of receivers on October 27, 1910, and has since been operated under the jurisdiction of the federal court. F. A. Dolph, W. C. Niblack and S. W. Ladd have been conducting the affairs as receivers.

Government Ownership Receives Blow in Manitoba Report

Commission Appointed to Investigate Conduct of Telephone System in Canadian Province Finds Gross Mismanagement Everywhere Evident – Big Over-Purchase of Equipment and Lack of Proper Accounting Two Points Strongly Condemned

The full report of the special commission appointed last January to investigate the Manitoba government telephone system has now been made public. It constitutes, in the main, a strong argument against government ownership, in that it shows gross carelessness in administrative methods, extravagant expenditures for construction and construction materials and a total lack of coherent system in operation generally.

Hearings were held in a number of centers of population throughout the province and the conditions found there were accepted as indicative of those to be found generally. Comment is made on the apathy of the public toward the investigation, although the proposed increase in rate schedules, which brought about the inquiry, affected a large number of telephone users. This increase, it is recommended be suspended, at least for a time.

The telephone commissioners, in charge of the administration of the government's system, declared that they had been permitted to conduct the business without interference of any kind and precisely as would a board of directors of a private corporation. Nevertheless, it was found that they seldom consulted as a body, although matters were informally discussed between them from time to time.

An utter lack of uniformity in methods, both of construction and operation, and particularly in the accounting systems employed, is severely commented on.

As a whole, the commission found that the system is modern and in excellent physical condition, that it is a "thoroughly well built, equipped and up-to-date plant; that it is in a good state of repair and is capable of furnishing first-class service to its subscribers." But it also found that a "proper system of accounting and of records" has never been instituted; that construction "has not been economically done," and that "the cost of maintenance and operation has been excessive." Neither has there been any provision made for a replacement account, which, it is recommended, should be done.

Touching further upon the lack of proper accounting methods, the report states that no comprehensive set of books was ever opened by the commissioner auditor during the entire four years of operation by the government and that, at the time it was announced that rates must be raised to recoup losses in the operating department, "the books and records of the company were in such a condition that no one could tell definitely just what the loss, if any, had been or might be by the end of the year." In one department alone, the stores, it was found that there were over 10,000 invoices not entered in the general books.

In the construction engineering department, no one individual was entrusted with the responsibility for all estimates and detailed records of construction, and confusion resulted. "Such records," says the report, "were not kept in this or in any department." Searching into the causes of the abnormally high traffic costs, the commission found, among other things, that 25 per cent. more operators are employed at Winnipeg than are found necessary at other points outside the province.

"We have evidence," the report goes on, "particularly in the country districts, of much waste of time by construction gangs. We find that foremen of crews were provided with unnecessarily large sums of money for current expenditure, but that the system of checking this expenditure was insufficient." Vouchers only were demanded from the men and the commission found the "prevailing custom" to be the procuring of these vouchers signed in blank. "There is abundant evidence to prove conclusively the general prevalence of this pernicious custom," says the report, "and in some instances it was shown that the amounts written in the vouchers, after signature, were greater than the amounts actually paid."

Over-equipment is another feature to which attention is directed. The report says: "Probably the most flagrant case which has come to our attention is that at Brandon, where, according to the commission engineer, the capacity of the switchboard has been doubled within the past five or six months." From a capacity of 1,500 lines, the board was increased to approximately 3,500, a capacity which "would not be used up in ten years, or during the normal life of the switchboard."

Regarding the purchase of supplies, the report says: "Our investigation has convinced us particularly of two facts, one that supplies are purchased very largely in excess of requirements; the other, that excessive prices are paid therefor, owing to lack of competition." As an instance of over-supply the commission cites the fact that "poles were in hand at the beginning of this year sufficient, at forty poles to the mile, to build 4,069 miles of pole line, which is within a very little of the total of pole mileage constructed in the last four years."

The commission also finds that "large quantities of materials have been purchased without observing the formality of asking for tenders." Where bids have been received, it was found that the lowest bidder has usually been the favored one, but in a majority of cases great amounts of supplies have been purchased "without in any way intimating to well-known dealers that such commodities are in demand, with the result that the lowest prices are not got."

Out of a total value of $797,136 of certain classes of material bought in 1911, the report states that $725,916 was taken from the Northern Electric Co. and the Wire & Cable Co., "two companies said to be controlled by the Bell company."

Coming to the matter of rates in Winnipeg particularly, the commission asserts that "no persistent or effective effort was ever made towards the introduction of party line residence service, or other economic device, as a mode of increasing revenue without a proportionate increase of traffic cost."

Discussing the proposed inauguration of measured service in that city, the report says: "From a very careful investigation, we are satisfied that, as yet Winnipeg is not in a position to warrant the adoption of such. The history of measured service, so far as we are able to ascertain, does not tend to show, except in rare cases, that it has been a success, or at all satisfactory in cities of anywhere near the population of Winnipeg. Telephone engineers uniformly agree that a measured service properly established at a sufficiently high basic rate is the most profitable thing in the world for a telephone company, but the Manitoba government system is not supposed to be a money-making proposition, its aim being to supply the greatest amount of service to the people at the lowest possible cost."

The report further says: "The condition of the books and records is such that we cannot secure the necessary data upon which to pass a definite opinion as to the actual costs of operation at any one point throughout the province or at Winnipeg. However, our own investigation, together with such figures as we have been able to obtain, and our finding as to the general extravagance, which has obtained throughout the system, lead us to conclude that while there may be a necessity for an adjustment of rates at various points such as has been indicated in the foregoing remarks, we believe it

is not necessary to continue the rates now partially in effect, and which will automatically apply to all subscribers on the first of July, next."

Considerable space is devoted to a trip made by the commission to Chicago to investigate the plant of the Automatic Electric Co. and the system of the Illinois Tunnel Co. there, which employs the automatic equipment. The report then, in conclusion, says: "As a result of our investigations we have found that the Manitoba government telephone property is well built and well equipped; that good service has been provided to the public; that the system has generally been administered extravagantly and that very large saving could be made by economical management; that there has not been a proper system of accounting and of keeping records in the various departments; that the proposed increase in rates and the introduction of the measured service is not required to put the system on a sound basis; and that the automatic system demands close investigation and earnest consideration."

Basis of Ouster Suit Filed Against Bell in Arkansas

Violation of State Anti-Trust Law Alleged in Complaint Filed at Instance of Attorney General, in Which Combination to Suppress Competition and Regulate Rates for Service are Charged—Telegraph Companies also Sued Under Same Law

In the suit brought at the instance of Hal L. Norwood, attorney general of Arkansas, by Grant & Mack, attorneys, of Newport, Ark., against the Southwestern Telegraph & Telephone Co., briefly reported by this paper last week it is asked not only that a $500,000 fine be assessed against the corporation, but also that it be deprived of its right to do business in the state. An action, on precisely similar grounds, and asking the same penalties, has been laid against the Western Union Telegraph Co. and the Postal Telegraph-Cable Co., of Texas. All of these companies are under the control of the American (Bell) Telephone & Telegraph Co. The Postal Telegraph-Cable Co., of New York, City, is not involved in the suits.

The complaint in the case against the Southwestern Bell sets forth that the company is a foreign corporation doing business in the state of Arkansas and that it was transacting business in the state on January 1, 1910, and every day since then, excepting Sundays. It is declared:

> That on the dates set out . . . and on each and every one of them, the defendant had created, entered into and become a member of, and was a member of and a party to a pool, trust, agreement, combination, confederation and understanding with the American Telephone & Telegraph Co., the Postal Telegraph-Cable Co. of Texas, the Western Union Telegraph Co., all corporations, and with other corporations, partnerships, individuals, persons and associations of persons, the particular designations whereof are not known to your relator, but are peculiarly within the knowledge of the defendant, to regulate and fix and maintain when so regulated and fixed, the price to be paid for sending telephone and telegraph messages, contrary to the form of the statutes in such cases made and in violation thereof.

Alleging that the Southwestern Bell, the defendant, had transacted business under the conditions recited in the foregoing paragraph, the complaint continues:

> That by an act of the general assembly in Arkansas, entitled, "An Act providing for the punishment of pools, trusts and conspiracies to control prices, and as evidence and prosecution in such cases," approved January 23, 1905, it is provided in section one thereof that "any corporation organized under the laws of this or any other state or country, and transacting or conducting any kind of business in this state . . . who are now, or shall hereafter create, or enter into, become a member of, or party to, any pool, trust, agreement, combination, confederation, or understanding, whether the same is made in this state or elsewhere, with any other corporation, partnership, individual or any other person, or association of persons, to regulate or fix, either in this state or elsewhere, the price of any article of manufacture, mechanism, commodity, convenience . . . or any article or thing whatsoever, . . . or to maintain said price when so regulated or fixed, . . . shall be deemed and adjudged guilty of a conspiracy to defraud and be subject to the penalties as provided by this act."

It is shown that the penalties provided for violation of the act shall be a fine of not less than $200, nor more than $5,000 for every offense and that each day that the violation continues shall be adjudged a separate offense; as well as the forfeiting of the rights and privileges of the corporation thereafter to do any business in the state.

It is alleged that the Southwestern Bell has done business, as a member of a pool, or combinaion, as previously set forth, has thereby forfeited its right to continue to transact business in the state of Arkansas and is, further, subject to a fine of not less than $500,000, based upon the number of days mentioned, during which the alleged illegal acts were taking place.

It is charged in the second portion of the complaint:

> That said defendant, with the design of driving out of the state all telegraph and telephone companies, except such as were allied with it and members and parties the aforesaid pool, trust, agreement, combination and understanding, for the purposes aforesaid, combined, consolidated and affiliated its capital, credit, property, assets, trade, skill, custom acts and other valuable things and possessions, with the said American Telephone & Telegraph Co., the Postal Telegraph-Cable Co., of Texas, the Western Union Telegraph Co. and the other corporations, partnerships, individuals, persons and associations of persons, named and not named, and by reason thereof has destroyed and driven out all competition, and had destroyed and driven out on all the dates aforesaid all competition and competing companies in the towns of Walnut Ridge, Black Rock, Little Rock, Wynne, Harrisburg, Earl, Marion and divers other and sundry cities and towns in Arkansas and elsewhere, thereby creating a monopoly of telegraphy and telephone business in this state and elsewhere. That the effect of said pool, trust, . . . and understanding, as hereinabove mentioned would be to produce a monopoly, which is forbidden by the act of the general assembly, . . . thereby enabling the defendant and associates herein named and not named, to control the telegraph and telephone business and to regulate and fix and maintain when so regulated and fixed the price to be paid for sending telegraph and telephone messages.

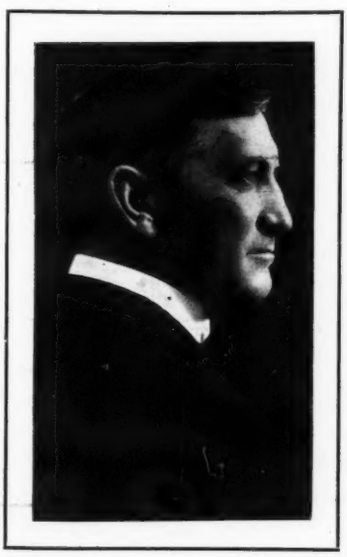
In conclusion the complaint declares that the defendant has violated the anti-trust laws of the state and is liable to the state "in the sum of not less than $200, nor more than $5,000 per day for each and every day of such offense. Wherefore, plaintiff prays judgment for the sum of $500,000, and that defendant's right and privilege to do business in this state be cancelled, and for all other and proper relief."

It is contemplated that proof will be taken by the state on its side of the case in August, so that the case can be tried in the month of September. Each of the three cases, against the Southwestern Bell, the Western Union and the Postal of Texas, will be called for trial in the September term of the circuit court, in Newport.

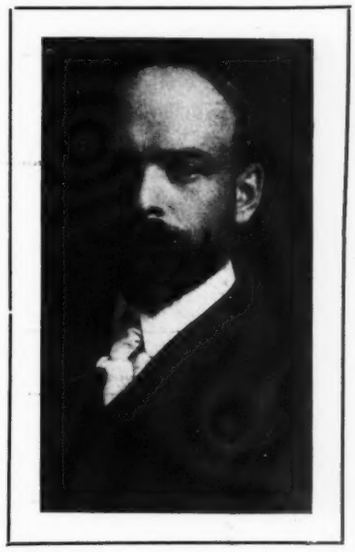
A Quartet of Men Prominent in the Telephone Field

PHILLIP P. NUNGESSER, general superintendent of the Nungesser Carbon & Battery Co., Cleveland, Ohio, was born in Cleveland, March 28, 1859. He followed his early education with private studies in chemistry, under the tutelage of Professor Freeman, of Cleveland. Later he pursued his investigations in the metallurgical laboratories of the Canadian Copper Co., under the supervision of Messrs. Garnier and Machau, of Paris. During the course of his experiments and studies Mr. Nungesser has developed many valuable and practical applications of scientific principles, his researches having carried him into wide fields. Among other things he was the manufacturer of practically the first commercially successful dry battery for telephone service. He has been active along other lines of telephone equipment and apparatus as well, having made the drawing for the first switchboard used in Cleveland by an Independent telephone company. All the details of the manufacture of the Nungesser company's product are now under his supervision.

WILLIAM ANDREW WYNNE, president of the Raleigh Telephone Co., Raleigh, N. C., was born in Raleigh, on March 27, 1869. He was educated in the grade and high schools of his native town and the Davis Military Academy and the A. & M. College. He entered the telephone field in 1896, building toll lines, later becoming manager of the Inter State Telephone Co. In 1899 he organized the Raleigh Telephone Co., the third exchange in the United States to install the common battery system for a single city. He has always been active in the work of the North Carolina Independent Telephone Association, of which he is president. He is the inventor of the well known Wynne System of Instantaneous Telephony, which is in use at Raleigh and elsewhere. In his early life Mr. Wynne was an exhibition bicycle rider, showing at Portland, Me., and up and down the Atlantic Coast from Boston to Atlanta, Ga. Later he pitched ball for two years in the Southern League, the Eastern League and the Washington National League. He is an Elk and a member of the Raleigh Country Club.



THADDEUS S. LANE, of Spokane, Wash., is president of the following companies, located in Washington, Montana and Idaho: The Interstate Consolidated Telephone Co., of Spokane; the Home Telephone Co., of Spokane; the Montana Independent Telephone Co., of Butte; the Interstate Telephone Co., Ltd., of Spokane; the Helena Automatic Telephone Co., of Helena; the Great Falls Automatic Telephone Co., of Great Falls; the Billings Automatic Telephone Co., of Billings; the State Telephone & Telegraph Co. of Bozeman; the Idaho Independent Telephone Co., of Pocatello, and others. Mr. Lane went from the East to Butte in 1906, there organizing the Montana Independent. From this he has extended his activities until the affiliated companies which he heads cover a large territory in the three states named. Mr. Lane was born in Ohio, in February, 1875. In his early life he taught school and later was a commercial salesman. He was associated with several Independent telephone companies in the East, before going to Montana. He is an Elk.



GEORGE HENRY GLASS, general manager and engineer for the Citizens Telephone Co., and president of the Union Electric Mfg. Co., Pekin, Ill., was born at Harrisonburg, Va., May 5, 1861, attended grade schools and Virginia Military Institute, learned telegraphy at the age of 18. and went to work as night operator in 1879. After holding various positions, he was assigned to the road's general offices, at Richmond. In October, 1883, he entered the telephone field in the employ of the Southern Bell Telephone & Telegraph Co., as troubleman under Chas. E. McCluer. On March 1, 1884, he was made manager at Wilmington, N. C.; on April 1, 1885, became manager of the Raleigh and Durham exchanges and was also traveling state inspector of exchanges. Twelve years later he went with the Inter State Telephone & Telegraph Co. as construction foreman and switchboard man. In May, 1895, he accepted the general management of the Lynchburg (Va.) Telephone Co., resigning from that position October 1, 1901, to take his present place. Mr. Glass is a Mason, Odd Fellow, K. of P. and an Elk.

More About the Postal

Some Mysterious Ways—A Popular Commandment

By J. C. Kelsey

When Moses worked up high among the hills on the Mosaic law, he builded better than he knew. "Thou shalt not steal" has been in existence for these thousands of years. All of a sudden, two great concerns saw its applicability to modern times.

The first to find it was the Postal Telegraph Co. The second to discover its intrinsic worth were the enemies of President Taft. And it has come to pass that the pet law of Moses has been given its proper place.

"Thou shalt not steal" sounds good, but Moses forgot the penalty.

But who in America can throw stones at his own glass house? Who has not stolen our timber, land, stock and profited by the tariff? Those who did not have the chance! Who robbed the government in the Civil War? Everybody who could!

Even the honest Pennsylvania farmer did some stealing when he got $3 a bushel for his wheat and $40 a ton for his hay. It paid him to hire a substitute.

Let us hope that "Thou shalt not steal" may be brought about to mean something. It surely does not, when decadent politicians appeal to it. And it means nothing when a suffering corporation does likewise!

When you get right down to brass tacks, the Postal Telegraph Co. violated this commandment itself. What else did it do when it gave out that it was going to co-operate with the Independents? And I fell for the trick myself!

My first eye-opener was when Sidney Whyte, of Kosciusko, Miss., told me of his deal. And last week I got another letter, this time from one of our biggest telephone men, and from a location of such vital importance that fullest publicity should be given. The letter runs as follows:

Spokane, Wis., June 21, 1912.

J. C. Kelsey, Financial Editor,
Chicago, Ill.

Dear Sir:

Some time ago I read with a great deal of interest in TELEPHONY, your article on the Postal's attitude toward Independent telephone companies.

Up to this time, we have said nothing about our own trouble with the Postal, but for your information, to use if you see fit, I append herewith a few notes.

Yours very truly,
(Signed) Thaddeus S. Lane, President.

Following is Mr. Lane's narrative of his experience with the Postal. To my mind, there seems no reasonable excuse possible for the behavior of the Postal Telegraph Co. Read every word of this story:

In June, 1911, after much correspondence and red tape, and following the announcements of the Postal's benign attitude toward all Independent companies, the Home Telephone Co., of Spokane, which operates one of the newly launched automatic systems, entered into a lease with the Postal Telegraph Co. for the use of its metallic long distance circuit to Seattle.

The Home company also entered into a lease with the Northwestern Long Distance Telephone Co., of Tacoma, by which it secured connections with Portland, Tacoma, Bellingham and the entire group of Independent companies in the coast cities.

The acquiring of this service was considered a triumph for the Independents in the Inland Empire. It was only a matter of a short time until the line over a short gap on the Idaho Panhandle would be built, and thus connect the affiliated companies in Montana with those in northern Idaho and eastern Washington. This would give the system a continuous stretch of wire from near the Dakota line to the Pacific sea-board.

For some time, negotiations were held up until a stretch of line was built from Seattle to Kent, which cost approximately $1,600. The Postal did not for a moment think of bearing any of this expense. The Home Telephone Co. had to foot the bill in order to get the coast-wide service.

When the work on this line was completed, the long distance line went into service. The Home Telephone Co. advertised it extensively, spent a great deal of money exploiting the new connection and secured a large clientele.

The line never, at any time, gave twenty-four hours continuous satisfactory service. Thirty miles of it was stretched on trees, and in the city of Spokane itself, the Postal circuit was so close to the high tension lines that the transmission of sound was inferior, especially at night.

To offset this, the Home Telephone Co. offered the Postal free conduit space for its line. The Postal refused to accept this, nor would it let any of our workmen do anything to improve the circuit—and its people were indifferent about improving it themselves. The Home company's engineer made a trip over the line to put it in good condition, but his report and recommendations were ignored.

The Home Telephone Co. developed long distance business from Spokane to coast points, the volume of which was about $40 a day. However, this business soon fell off on account of the inferiority of the service.

In January, the Home company notified the Postal that the line must be put in better order, or the lease would be terminated. In February, the Postal cut off the service altogether and announced in the papers that it was in the long distance telephone business for itself on a cut-rate basis!

The Postal has demanded the full amount of rental from June 1, 1911, and have started suit against the Home Telephone Co. to recover it. The Northwestern Long Distance Telephone Co. has also brought suit against the Home company for violation of contract.

It is the belief of the Home officials in Spokane that the Postal Telegraph Co., when it saw the possibilities of the long distance business between Spokane and the coast, deliberately kept the lines intermittently out of commission, with a view of having its contract broken.

Although the Home company has started suit for damages against the Postal, even the recovery of this will not offset its loss of prestige.

You all remember the great noise made by the Postal company about this Seattle-Spokane arrangement.

My Mississippi friends tell me that they hesitated to kick because the Postal was doing so well by the Independents elsewhere.

They had heard about the Salt Lake-San Francisco line being used for telephone service, yet they knew there were no telephone companies at either terminal.

So I think it is just as well for the world to know the facts!

Look into the Spokane situation. The Postal did not expect to bear any of the expense from Seattle to Kent. The Home company spent a great deal of money advertising. And the line never gave twenty-four hours continuous service!

Think of a long distance telephone line stretched on

trees for thirty miles, close to high tension wires, and the service you would get. Then the Postal refused to allow the line to be put into good condition. And finally the Postal cut off all the service and went into the long distance telephone business itself!

As competitors!—After all the bunk they have handed out. "Thou shalt not steal." A man made use of that expression who himself was no thief.

It is certainly ill fitting for the Postal Telegraph Co. to make any complaint.

I say again that the Postal company had the grand opportunity. And failed to avail itself of it.

It is all very well to abuse the Western Union, but let me tell you that the night letter originated by the Western Union is enough to cause its past sins to be forgiven!

The Postal Telegraph Co. is not competing with the Western Union.

It is playing into the Bell hands as prettily as could be expected.

What a questionable deal that Spokane matter is! After letting the Home company advertise the service for a period and then going into telephone service itself!

If the telephone practice is as crude as the telegraph devices, we can imagine the service must be fine (?) on those tree lines.

I have no great love for the Bell-Western Union crowd. And I bitterly regret that my Postal idol has been broken. But this gag of "Thou shalt not steal" is not going to advance the Postal very far.

The Postal company had the first chance at Lincoln, Kansas City, Cleveland, Columbus, etc.

Long before anyone ever thought the Bell management would admit defeat and sell its property, the Postal Telegraph Co. was sought out for recognition by Independent companies.

But you can see that nothing was done. And I believe that nothing was ever intended.

The Postal Telegraph Co., if it is really a separate and Independent unit (and I believe it is), is living on prejudice, just as many of our Independent telephone companies did, and it can't last always.

Prejudice is a fine thing to start on, but it makes a poor and sorry finish.

In New York, a man called up for the Postal and got it. While dictating a telegram, the connection was broken. When restored, the telephone company had switched him to Western Union. Shameful! Wasn't it?

Did any human being ever put his head in a lion's mouth and expect to get away alive? In New York, what else could you expect?

If the New York Telephone Co. really did switch that call, I admire its energy.

The story sounds fishy to me, because the Western Union, so suddenly put on to a call, would surely have to go back to the address and do everything over again.

Such stupidity should easily be detected. I don't believe it! It does not happen in Chicago. I have never had the least bit of trouble in getting Wabash 2970.

That is the Postal's telephone number, and I get it every time without fail.

They are having a big fight over the code-word "Telegram." As usual, the expert Bell witness foozled up the testimony. But I will bet that the Western Union keeps the word "Telegram" wherever it can. In New York the commission has ruled against it.

Really, I did not know there was so much enterprise in the sleeping giant.

The Bell company reminds me of China in lots of ways. If it ever does wake up to its power, it will be dangerous!

The Postal magazine asks why the attorney general of the United States does not file a bill in equity to sever the relations between American Telephone and Western Union.

I thoroughly sympathize with this demand, because it involves the Western Electric Co. in the same deal.

If it is illegal to operate American Telephone and Western Union, it is manifestly illegal to operate American Telephone and Western Electric.

I can't understand why the Taft administration does not get busy on this very apparent fault.

No one blames the Postal for fighting for its rights. But it can be blamed for selfishness.

The Postal reminds me of that bird, the cuckoo, which is always hatched in another mother-bird's nest, and which eats so vigorously that the legitimate birds starve to death.

The cuckoo is too lazy or too mean to build its own nest, so she lays a single egg in every visible nest. And no doubt would cry her eyes out if the invaded birds should dump the egg out!

The Postal Telegraph must build its own nest or foundation, make good alliances and get beyond the fly-by-night stage before expecting its cries of distress to be heeded.

The Spokane matter reminds me of the relation of the licensee company to the parent Bell company. The Spokane Home company did all the advertising and business-developing, and was left high and dry.

The Bell Telephone Co. of Missouri did the advertising that Jefferson City could be finally reached over Bell lines. The commissions due to the Bell licensee from the parent Bell did not begin to pay the advertising.

So it seems to be a habit, not only of the Bell parent, but the Postal as well, to let others pay the bills and do the work. All they care to do is to take all the money.

Really, it makes a beautiful picture, this unselfish service of the Bell parent, Western Union and Postal, too!

I hope no reader will shed any tears over this heart-rending fight. There is no call for them! The parties concerned have made their bed and they can not escape the troublesome sleep.

Just because men control millions of dollars' worth of property, it is no sign they could succeed with a corner grocery or run a farm.

There are many ways in frenzied finance to dodge the after-effects of foolishness. These usually fall upon the shoulders of the investors. Respectability is no guaranty at all to investors.

Poor old Admiral Evans lent his name to some California oil wells. And out of a $10,000,000 company but $61 was found in the treasury applicable to the stockholders who bought because "Fighting Bob" heartily approved!

It seems incredible that men and corporations can get up a fight over a word. Yet the word "Telegram" is causing lots of grief and heartache.

Two Kansas farmers fought fifty years over a calf worth $4. The Postal-Western Union fiasco is just as silly!

Long, long ago there was something said by the great

economist about the man who "built his house upon the sand." The rains beat and the winds blew and the house fell because it was built upon the sands.

Any institution, with no particular merit except an appeal to popular prejudice, occupies a house built upon shifting sands.

The Postal situation, from the Independent standpoint, reminds us of a fable. A ferocious bear suddenly attacked two men. One man ran and the other feigned death so successfully that the bear spared him. The fellow who ran away came back and asked what the bear did. The man who feigned death said "the bear told me to associate no longer with one who deserts a friend in time of danger."

It strikes me that the Spokane matter covers this ground!

MORAL:—There should be no exceptions to the seventh commandment!

Copper Stocks Decrease 5,280,639 Pounds.

Copper Producers' Association reports stocks on July 1 as 44,335,004 pounds, a decrease of 5,280,639 pounds, as compared with 49,615,643 pounds on June 1. Production and deliveries compare as follows:

	June	May
Production	122,315,240	126,737,836
Domestic deliveries	66,146,229	72,702,277
Foreign deliveries	61,449,650	69,485,945
Total deliveries	127,595,879	142,188,222

Stocks of copper by months this year, as reported by the association, compare as follows:

	Pounds	Changes by Months	Total Changes Since Jan. 1.
July 1	44,335,004	Dec. 5,280,639	Dec. 45,619,691
June 1	49,615,643	Dec. 15,450,386	Dec. 40,339,052
May 1	65,066,029	Inc. 2,698,472	Dec. 24,888,666
April 1	62,367,557	Dec. 572,431	Dec. 27,587,138
March 1	62,939,988	Dec. 3,340,655	Dec. 26,014,707
February 1	66,280,643	Dec. 23,174,052	Dec. 23,174,052
January 1	89,954,695	Dec. 22,330,493	.....

Queries on Theory and Practice

Using Automatic Telephones on Manual Systems.

Can an automatic telephone be used on a manual system so as to save the cost of extra telephones where both kinds of service are used in the same building? I refer to a case where a concern has its own manual exchange and wants connection to the public automatic exchange also.

If you can take care of the battery supply on both systems the automatic telephone will work equally well on

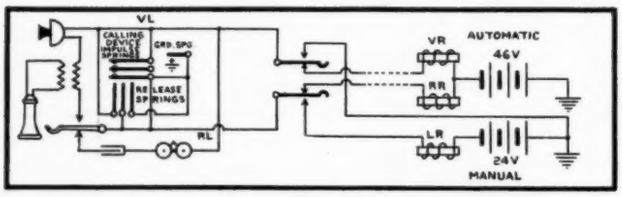


Fig. 1.—Circuit for 3-Wire Automatic Arranged to be Switched to a Manual Line.

both manual and automatic lines. In fact, this is being done in many places. If both the automatic and manual switchboards are of the common battery type, no change whatever need be made in the automatic telephone to enable it to be switched onto the manual line. Fig. 1 shows a 3-wire, common battery, automatic telephone arranged to operate normally on an automatic line and to be switched onto a common battery manual line by the simple throwing of a key. Fig. 2 shows the same arrangement for a 2-wire automatic telephone.

If the telephone is receiving its regular service from a

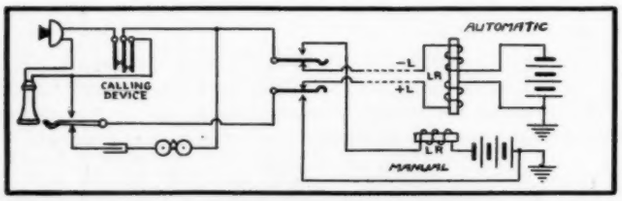


Fig. 2.—Circuit of a 2-Wire Automatic for Switching to a Common Battery Manual Line.

manually operated *P.B.X.* board with trunks to the public automatic system, direct calls can be made by the subscriber by having the *P.B.X.* operator plug the connection through with a cord circuit. This will give a clear pair of wires, over which the signals may be sent to operate the switches.

Code Letters for Long Distance Operators.

Please publish in TELEPHONY the letters that stand for certain phrases, such as "Won't answer," "Line's Busy," etc., used by long distance operators.

The official code compiled by W. S. Vivian of the Michigan Independent Telephone and Traffic Association, for use by the long distance operators of the companies belonging to the association, is as follows:

Absent, not expected today	N.D.
Anyone	A.Y.
Anyone who can talk business	A.B.
Appointment call	Apt.
Chief Operator	C.O.
Cannot locate	C.F.
Cancel	C.A.
Does not answer	D.A.
Discontinued	D.S.
Get better address	G.B.A.
Keep after	K.A.
Leave word	L.W.
Left telephone	L.F.
Messenger	M.G.
Messenger not returned	M.N.R.
No circuit available (busy circuit)	N.C.
No telephone listed	N.F.
*Not there	N.H.
No report to give	N.R.
Out, expected at (time)	U.
Out, do not know when will return	U.D.
Out of order	O.D.
Report on ticket No.	O.R.
Telephone busy	B.Y.
Telephone reached and looking for party	L.K.
Try again	A.G.
Unknown	U.N.
We have your party	W.H.
Will talk	W.T.

*Note—N.H. is used only in case of calls to hotels, clubs or other public places, and not in the case of calls to persons at their regular places of business or residence. See N.D., U. and U.D.

A Study of the Vibrations of Telephone Diaphragms

Results of Investigations Regarding Diaphragm Vibrations Given in a Paper Presented at the Annual Convention of the American Institute of Electrical Engineers, Held in Boston in June—Final Installment Describes the Experiments with the Telephone Transmitter

By Charles F. Meyer and J. B. Whitehead

For the transmitter the general problem is similar to that for the receiver, namely, to exert an oscillating force of known form on the diaphragm and record the vibration produced by it. As in actual use the transmitter is acted on by sound waves, the most natural thing would be to use these for the impressed force, but experimental difficulties arise which make this impracticable.

It is difficult, if not impossible, to get a source of sound which is sufficiently loud, and at the same time gives a pure tone, of which the pitch and intensity may be easily varied and measured over a wide range. Moreover when working with sound sources in an enclosed space, such as the room of a laboratory, there are always standing waves set up between the walls of the enclosure which would introduce a further uncertainty in determining the intensity of the sound which is incident upon the transmitter diaphragm. For these reasons no attempt was made to use a sound source. From the work on the receiver, the conclusion seemed justified that the pull produced on the diaphragm by the receiver magnet is nearly harmonic for a

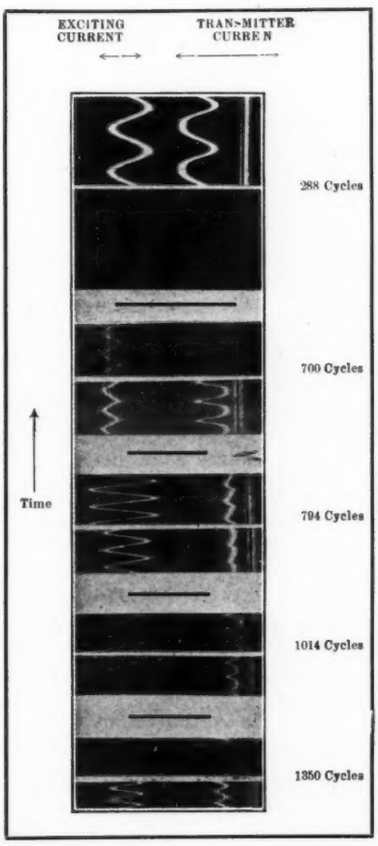


Fig. 10.—Some of the Transmitter Records.

harmonic current, and the amplitudes of the force and current are proportional if the current is not too great.

It was accordingly decided to use a receiver magnet for producing the force acting on the transmitter diaphragm, as this allows the frequency and amplitude to be easily varied and measured. The magnet of a receiver was mounted rigidly in front of the transmitter. A small iron disk was shellaced on to the diaphragm to have some magnetic material for the magnet to act on, as the transmitter diaphragm themselves are of aluminum. The necessity of using the disk and the fact that the magnet produces a central force instead of a distributed one,

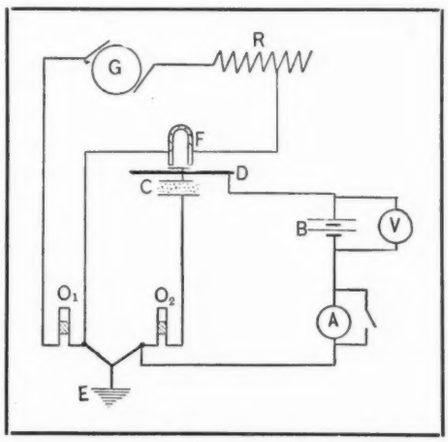


Fig. 11.—Electrical Connections for Transmitter Experiments.

as does a sound wave, are disadvantages of this method. (The weight of the disk was 0.81 gram.)

The current from the alternating current generator was passed through the coil of the receiver magnet, and the current wave recorded on the oscillograph. For recording the vibration of the diaphragm, the mirror method would have had certain advantages, but with a system as stiff as the transmitter the amplitude would not be great enough. Current from a storage battery was passed through the transmitter and the second vibrator of the oscillograph in series, and the variation of current in the transmitter due to the vibration of the diaphragm was recorded on the same photographic plate on which the curve of the current through the magnet was recorded; the variation of current in the transmitter was taken as a measure of the oscillation of the diaphragm. The electrical connections are shown in Fig. 11.

In one electrical circuit, which will hereafter be referred to as the "magnet circuit," the high frequency generator G, the oscillograph O_1, the coil on the magnet F and the resistance R are in series. In the other circuit which will be called the "transmitter circuit," the current flows from the storage battery B to the diaphragm D through the carbon granules box of the transmitter C to the oscillograph O_2, and through the milliammeter A back to the battery. The battery consisted of three storage cells; the voltage remained constant at 2.9 volts throughout. The two circuits had the point E in common at which they were connected to earth.

The action of the apparatus is simple. The alternating current in the coil of the magnet F causes the diaphragm D to vibrate. Before the beginning of the vibration, the current in the transmitter is steady and can be read on the milliammeter A. This steady current causes a steady deflection of the oscillograph O_2. When the motion of the diaphragm begins, the current undergoes variations which are recorded by O_2. During the time of making an exposure the milliammeter is shunted so

as to do away with all possible self induction in the transmitter circuit.

Photographs and Measurements.

Some reproductions of the photographs are shown in Fig. 10. The trace on the left shows the current in the magnet coil. The zero line is not shown, but would traverse the middle of the trace as this is due to a simple alternating current. The straight dark line on the right gives the line for zero current in the transmitter. The trace to its left gives the variation of current through the transmitter when the diaphragm is oscillating. That is, the distance from the zero line to the trace at any point gives the instantaneous value of the current, and the difference between the maximum and minimum distance gives the range of oscillation of the current. The frequencies are given to the right.

On the plates for 700 and 1014 cycles, and on most of the plates not reproduced, the traces are pointed for maximum current (granules compressed) and flat for minimum current. In these cases the steady current line runs nearer the minimum than the maximum. This was shown by an asymmetrical broadening of the light spot toward the left when the exciting current was turned on, and also by a rise in the reading of the milliammeter *A*.

In the first plate shown, namely for 288 cycles, this is reversed. The points are for minimum current and the flat side for maximum. In this case the steady current line runs nearer the maximum, the broadening being asymmetrical to the right, and correspondingly, the milliammeter fell on making the exciting current. The plate for 1350 cycles gives a more symmetrical trace than that of 288 cycles, but showed the same anomalous behavior in the broadening of the light spot toward less current, and the dropping of the milliammeter. These two plates were taken one after the other.

This anomalous condition had been observed visually on one occasion when observing the oscillations by means of a ground glass and a rocking mirror, but the transmitter had gone back

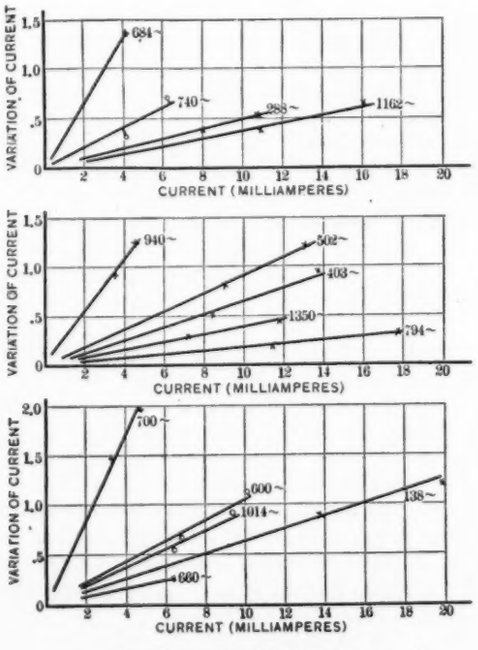


Fig. 12.—Current Relations.

to its normal condition before a photograph was obtained. After this no amount of tapping and exciting would bring it back. The plates in question were obtained when at the end of a series of exposures this condition was found to exist accidentally. After these two plates the transmitter returned to its normal state.

Later one more anomalous trace was obtained at 660 cycles, but this does not fit in well with the others. The peculiarity did not seem to occur at any definite frequency, but seemed to depend entirely on the arrangement of the granules, for when once present it showed over a wide range of frequency, and when absent the same frequency could be gone over with normal results. It is not to be confused with ordinary "packing," but may be closely allied to it. The traces for the transmitter in general show a great deal more distortion than do those for the receiver. The actual range of force on the diaphragm is considerably less for the transmitter, as the air gap between the magnet and disk is greater, and the amplitude of the current in the magnet is less.

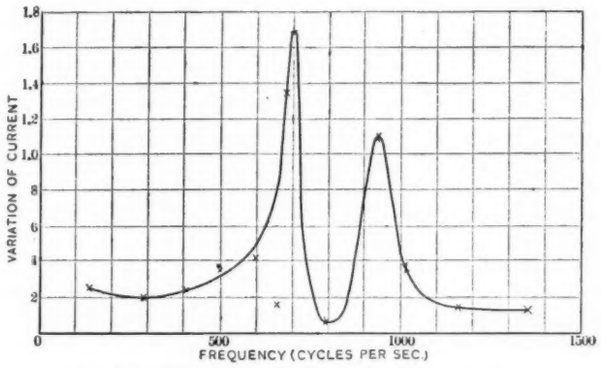


Fig. 13.—Resonance Curve for the Transmitter.

Plotting for each frequency the current in the magnet as abscissa, and the variation of current in the transmitter, per milliampere of steady current as ordinate, we get the curves of Fig. 12. This relation between the two is seen to be approximately linear. The point farthest out usually shows a somewhat steeper slope, but in several cases the reverse is true. The accidental errors due to changes in the transmitter are, of course, great, so a straight line running between the two points was considered a fair locus for the curve.

In Fig. 13 a curve is plotted having frequencies as abscissas, and as ordinates the variation of current in the transmitter per milliampere of steady current, when the current in the magnet has a constant value of four milliamperes. This is the resonance curve for the diaphragm. The points all fall fairly well into line except the one for 660 cycles, which is the one exposure made when the transmitter was for the second time in the anomalous state. The two plates obtained when it was for the first time in this state fall into line very well. The resonance curve certainly does not include the point at 660 cycles, as the light spots were watched visually, when the granules were in normal condition, and no drop in amplitude at that frequency was ever noticed. The light spots were watched time and again as the generator accelerated or came to rest; and it was easy to see the marked continuous rise and fall in the width of the oscillation. Whatever errors may have crept into the determination of one or two of the points, the general nature of the resonance is certainly that of Fig. 13.

We notice in the curve the slight fall before the first maximum which was present in the receiver diaphragm curves, and is probably due to the losses in the magnet. Next the sharp maximum at 700, the minimum at 800, the second maximum at 940, and after this the drop to a fairly constant value. It is regretted that the investigation could not be pushed above 1350; but at higher frequencies conditions became very unsteady, especially is this true of the average current through the transmitter.

It is a great surprise to find such sharp maxima in the curve, and two so close together. The ordinate of the first maximum is seen about eight and a half times that at the minimum, and six and a half times that at the lowest frequency; at the second

maximum about eighteen times that at the minimum just before it, and about four times that at the lowest frequency. The location of the fundamental vibration at 700 cycles is in good agreement with Gati's work. It is to be regretted that no data can be obtained from his results regarding the sharpness of the resonance. His curves having as ordinates the current in a secondary circuit, have a zero ordinate for zero frequency, *i.e.*, they start from the origin. Hence no comparison between the amplitude at resonance with that at zero frequency can be made.

The first resonance of the diaphragm we would naturally suppose to be due to its vibration as a whole. The second may be introduced by one of the so-called damping springs. The diaphragm in most modern transmitters, and in the one here worked with, is held in place by two pieces of spring steel about ⅜ in. wide 1½ in. long and 0.01 thick. These have rubber tips on the ends. One presses against the diaphragm at the edge; and the other one, some distance in towards the center. Now the point where the second one presses is more firmly supported than the points in its vicinity, so the second resonance may be due to a vibration of irregular configuration with this point lying on a nodal line. If this is the case one of the actions of the damping springs is just the opposite to that commonly supposed.

According to Kempster B. Miller*: "The object of these damping springs is to prevent too great an amplitude of vibration of the diaphragm, and also to keep it from vibrating in separate parts instead of as a unit." The inside damping spring may also have considerable influence in raising the fundamental period of the diaphragm as it adds to its stiffness. It should be possible to settle these questions by placing both springs on the edge and taking another resonance curve. It is hoped to do this in the near future.

SUMMARY OF RESULTS.

Photographs have been obtained showing the vibration of receiver diaphragms when approximately harmonic currents are passed through the receiver. These show considerable distortion at some frequencies and very little at others. At any one frequency, the distortion is less for smaller currents. This is what would be expected from a *priori* consideration.

An approximately linear relation has been shown to exist between current and amplitude of oscillation of the diaphragm over the range of work, which extends well beyond that of practice. Resonance curves for two receiver diaphragms have been plotted giving quantitative data of the influence of the natural period of the diaphragm.

The effect of a small load on the form and range of the oscillation was examined. Its influence could not be detected except in one instance in which there was possibly a slight effect on the range of oscillation.

Diametral vibrations of the diaphragm were observed in cases in which they would not have been expected from the apparent symmetry of the instrument. The orientation of the diaphragm over the pole pieces was observed to have a marked effect. It has not been experimentally settled whether this is due to the mirror or the grain of the plate, but it is difficult to see how a mirror weighing only 4 mg. could cause the vibrations. It is suggested that by properly introducing "diametral" vibrations, the transmission of speech might be improved.

Photographs have been obtained showing the variation of current in the transmitter when an approximately harmonic force acts on the diaphragm. These show a rather marked distortion even for the lowest exciting force used, which was very much lower than the lowest force used on the receiver diaphragm. These distorted curves may be just reversed from their normal form when the microphone is in a certain abnormal state.

An approximately linear relation exists over the range examined between the variation in current and the exciting force. The resonance curve of the transmitter is given showing very marked maxima and minima. The first maximum is attributed to the fundamental period of the diaphragm vibrating as a whole. The second maximum is attributed to the diaphragm vibrating in an irregular configuration on account of the damping springs.

*American Telephone Practice. 4th edition. p. 56.

Baltimore Association Perfecting Plans.

Peter Bryson Wood has been selected by the Baltimore Protective Telephone Association to solicit members and to take charge of the offices of the association during during its fight for the lowering of the telephone rates in that city.

Herbert Sheridan, secretary of the association and traffic manager of the Chamber of Commerce, says that by September 1 the association will appeal to the Maryland Public Service Commission to grant a hearing in reference to the lowering of the telephone rates. The executive committee of the association will meet soon to consider future action.

The Sign That "Gets Their Goat."

This is a reproduction of an electric sign employed by W. A. Wynne, general manager of the Raleigh Telephone Co., Raleigh, N. C., to attract public attention to the Independent service in that city. Mr. Wynne's "instantaneous service" has been fully described in these columns. In sending us this photograph, Mr. Wynne writes: "We present you herewith a photograph of our substantiated sign on front (of the exchange?) which queers them all—gets their goat." "Substantiated sign" had us guessing for a moment, but we think we have got the brother now. Certainly, not bad, and "getting their goat," presumably the opposition company's, is said to be a most delightful sport.

W. A. Wynne's Electric Sign at Raleigh, N. C., That "Gets" the Opposition's "Goat."

Pennsylvania Liability and Compensation Law.

The commission named by Governor Tener, of Pennsylvania, to draft an employer's liability and workman's compensation bill has reported in favor of many sweeping changes over the old law. The most notable clause is the one which eliminates all defence for the employer because of incompetency or intoxication on the part of the employe, since the former is not supposed to allow an incompetent person or one under the influence of liquor to start to work. According to the proposed bill in case of an accident to a workman he can collect 50 per cent. of his wages (within the limits of $5 and $10), for a period of from 125 to 400 weeks, depending on the nature of the accident; and in case of death a liberal compensation is provided for the dependent widow or children. The bill has gone to the legislature for its consideration.

Index for Volume 62 of Telephony Ready.

The index for volume 62 of TELEPHONY, including the issues from January 1 to July 1, 1912, is now off the press. Copies will be sent to all subscribers who ask for them.

Chicago Mayor Opens New Line.

Chicago's Independent telephone system was formally brought into communication with Grand Rapids, Mich., when Mayor Harrison, of Chicago, opened the new trunk line to that city and held a conversation with Mayor Ellis there.

The mayor's first business of the day after arriving at the city hall was to swing the dial of the automatic to get into communication with the mayor of Grand Rapids. Superintendent of Police McWeeny and Assistant Superintendent Schuettler stood on either side of the mayor as he raised the receiver, apparently very much interested in the initial operation of the long-distance automatic to the East.

A little politics and the usual felicitations were indulged in and the first Independent long-distance conversation from Chicago to a point east was ended.

The company, which is known since its recent reorganization as the Illinois Telephone & Telegraph Co. was represented by J. W. Callahan, general manager; C. W. Winkler, superintendent of the commercial department; Frank L. Eldridge, special agent, and H. A. Prussing of the promotion department.

Mayor Harrison, of Chicago, Opening New Long Distance Line.

Within a few weeks the trunk line will be extended to Detroit, and from there, the plans of the company provide, the lines will be extended rapidly to embrace all the important cities in the eastern states.

Oklahoma Commission Postpones Hearing.

The Oklahoma Corporation Commission has continued for the term the case of the Poteau Telephone Co. against the Pioneer Telephone & Telegraph Co., protesting against the establishment by the latter company of separate toll stations.

The commission has received a complaint from citizens at Comanche against the Comanche Telephone Co., asking for all-night service and better service generally, which has been set for hearing at Comanche next week Thursday, the twenty-fifth.

Recent Rulings of Kansas Commission.

In the case of L. A. Van Pelt, complainant, vs. The Paola Telephone Co., The Block Mutual Telephone Co., The Hillsdale Mutual Telephone Co. and The Richland Mutual Telephone Co., the Kansas Public Utilities Commission has found that, despite the fact that one of these companies had rented a few telephones to non-subscribers, it had discontinued the practice and that none of the concerns named were doing business for profit. Hence, the commission concluded that they were all mutual organizations, not operated for profit and, as such, were not under the jurisdiction of the commission.

The Central State Telephone Co. asked permission to consolidate with the Oberlin Telephone Co. and to issue stock and bonds for that purpose. The commission, after investigation, decided to grant the request and has authorized the consolidated companies to issue $150,000 of stock and $50,000 of bonds. Of the bonds, $20,000 shall be used to retire $30,000 of bonds now outstanding against the property, $10,000 for acquiring additional plant and in new construction, and $20,000 shall be held in the treasury for the same purpose later.

Another order granted the Farmers & Merchants Mutual Telephone Co., of Morton, Kans., until January 1, 1913, to establish a uniform rate of $1 for both stockholders and non-stockholders. The order was originally made by the commission on April 17.

The Osborne Telephone Co. and the Osborn-Cheyenne Telephone Co. each asked permission to charge subscribers desiring continual connection with the other company an additional sum of ten cents a month, and to charge a toll of five cents to all subscribers not desiring the connection regularly. These charges the commission approved.

The Farmers Mutual Telephone Co. complained that the Ellis Telephone Co. refused to serve four of its subscribers for less than $2 per month, although there was a contract between the two companies providing that the charge for the service to the mutual company's subscribers should be fifty cents per month, not more than fifty subscribers to be served.

The four in question were business men and, the commission finding that $2 was the regular charge for business service by the Ellis company—a rate not subject to alteration except by permission of the commission—it was held that that was the rate which should obtain under the circumstances cited.

Zone Rates in Oklahoma.

The objections to the establishment of "zone rates" by the Pioneer Telephone Co., which were scheduled to come up before the Corporation Commission soon on a complaint from Guthrie, will be embodied in a proposed order of the commission, either providing for a blanket rate or abolishing the zone rates, on which hearings will be held by the commission, probably in all of the cities affected. These are Oklahoma City, Guthrie, Enid, Tulsa, Muskogee and McAlester.

New England Bell New Stock.

It has been ordered by the board of directors of the New England Telephone & Telegraph Co. that 39,178 shares of capital stock of the company be offered to stockholders for cash at par. Holders of record at the close of business on July 20 are entitled to take one share of new stock for every ten shares then held. Subscriptions must be made for full shares and the right to subscribe expires August 31, next.

A New Military Post System.

A new central energy telephone system has just been completed at Fort Sill, Okla., at a cost of $30,000 and turned over to the government. It is said to be the most complete plant of its size in the state. A protected underground cable from the old to the new post alone cost $5,000.

Telegraph Line Construction Materials and Methods

An Interesting Presentation of Recent Telegraph Practice Given in a Paper Read at the Annual Convention of the Association of Railway Telegraph Superintendents, Concluded from Last Week's Issue—Discussion of Pole Costs as Related to Their Height—Construction Pointers

By R. E. Chetwood

Regarding the spacing of poles, the average spacing, or the number of poles per mile, was determined from a consideration of wire loads, pole line costs and the transmission efficiency of the circuits to be carried on the pole lines. The number of poles per mile decided on for the different classes of pole lines were those that theory and experience showed to be correct in order to give the required strength for the various loads, allowing, of course, for a proper amount of decrease in strength on account of decay of poles at the ground line. A required strength of pole line construction can, of course, be obtained by using a larger number of weaker poles or a smaller number of stronger poles. The problem then was to get a line of proper strength at a minimum cost and without decreasing the transmission efficiency of the circuits to be carried on the line below advisable limits.

You, of course, realize that the greater the number of poles per mile, the lower the insulation of the line wires during wet weather. The insulation per mile of wire on a pole line containing forty poles to the mile, is, under the same conditions, twice as great as the insulation per mile of wire on a pole line containing eighty poles per mile. As the insulation per mile of wire is a big factor in determining the telegraphic and telephonic efficiency of circuits, it is, of course, desirable to obtain as high an insulation as is practicable by using a small number of poles per mile as will give sufficient strength. The pole spacing decided on, namely 30 poles per mile for 6 wires or less, 41 poles per mile for from 7 to 60 wires, 53 poles per mile for from 61 to 70 wires, and 59 poles per mile for from 71 to 80 wires, has been found to be the best, taking all factors into consideration.

One feature of pole line construction and reconstruction on which considerable emphasis has been placed is the matter of the height of poles to be used. From every standpoint it is advisable to keep the height of poles as small as practicable. The smaller the height of the line, the stronger it is. Furthermore, when necessary to guy poles the strengths of the guys are much greater for the same amount of lead, if the poles are short ones than if the poles are high ones. A lead of 5 feet for a side guy in the case of a 20-foot pole gives a much more efficient guy than a lead of 5 feet in the case of a 30-foot pole.

The use of short poles is also most advisable from a cost standpoint. It reduces considerably the first cost and the annual cost of a pole line. It formerly was the practice of the telegraph company, in many cases, to set poles higher than was actually necessary so that at a later date the poles could be cut off and be reset. It was thought to be an economical practice, but in reality it was not economical. The following average figures will show you that it is economical, not only for the telegraph company, but also for the railroad company, to use in pole line construction and reconstruction as short poles as is practicable.

1. Approximate first cost of poles in place.

(a) First cost in place of 20-foot Class C cedar pole.

Cost of one 20-foot Class C cedar pole	$0.95
Cost of unskilled labor	1.45
Cost of skilled labor	.55
Total cost of pole in place	$2.95

(b) First cost in place of 25-foot Class C cedar pole.

Cost of one 25-foot Class C cedar pole	$1.85
Cost of unskilled labor	1.70
Cost of skilled labor	.70
Total cost of pole in place	$3.25

2. Approximate cost of replacing old poles with new poles.

(a) Cost of replacing a 20-foot Class C cedar pole with a new 20-foot Class C cedar pole.

Cost of new 20-foot Class C pole	$0.95
Cost of unskilled labor for removing old pole and setting in new pole	1.70
Cost of skilled labor for removing old pole and putting in new pole	1.30
Total cost of new pole in place	$3.95

(b) Cost of replacing a 25-foot Class C cedar pole with a new 25-foot Class C cedar pole.

Cost of new 25-foot Class C pole	$1.85
Cost of unskilled labor for removing old pole and setting new pole	2.10
Cost of skilled labor for removing old pole and setting new pole	1.50
Total cost of new pole in place	$5.45

3. Approximate cost of cutting off and resetting poles.

Cost of cutting off and resetting as a 20-foot pole a 25-foot Class C cedar pole.

Cost of unskilled labor	$0.90
Cost of skilled labor	.25
Total cost	$1.15

Take for instance the case of whether it is economical to set a 25-foot Class C cedar pole, which we will assume will have a life of approximately sixteen years, after which it can be cut off and reset and obtain a further life of approximately eight years, or whether a 20-foot pole should be set and then replaced by a 20-foot pole at the end of sixteen years.

If the 25-foot pole is used there will be the following expenditures:

First expenditure.

Material	$1.85
Unskilled labor	1.70
Skilled labor	.70
Total	$3.25

At the end of sixteen years there will be a second expenditure as follows:

Second expenditure—

Unskilled labor	$0.90
Skilled labor	.25
Total	$1.15

Now an expenditure of $1.15 comprising 90 cents for unskilled labor and 25 cents for skilled labor which must be made sixteen years hence is equivalent to spending now, such sums which if placed at compound interest will in sixteen years amount to 90 cents and 25 cents respectively. In other words, what is the present worth or amount of 90 cents and the present worth or amount of 25 cents due sixteen years hence.

Figuring compound interest at 6 per cent., it is found that the present worth of 90 cents is approximately 35 cents and the present worth of 25 cents is approximately 10 cents. The equivalent present expenditure in the case of setting a

25-foot pole and resetting it sixteen years later is as follows:

	Material.	Unskilled Labor.	Skilled Labor
1st expenditure	$1.85	$1.70	$0.70
Equivalent of expenditure due sixteen years hence		.35	.10
Totals	$1.85	$2.05	$0.80

If a 20-foot pole is set now and replaced by a 20-foot pole sixteen years hence, the expenditures are approximately as follows:

	Material.	Unskilled Labor.	Skilled Labor.
1st expenditure	$0.95	$1.45	$0.55
Equivalent of expenditure due sixteen years hence	.37	.57	.22
Totals	$1.32	$2.02	$0.77

From these figures it is seen that there is a saving in the cost of material, a saving in the cost of unskilled labor and a saving in the cost of skilled labor by using a 20-foot pole instead of a 25-foot pole The economy of using short poles can readily be calculated for other classes and lengths of poles and it will be found to be the economical thing to do, not only from the telegraph company's but also from the railroad company's standpoint. These figures do not show all of the economies resulting to both companies by the use of as short poles as is practicable, for they do not take into consideration reduced guying costs, reduced freight costs and the increased safety of the pole line, all of which are worth considerable to the railroad companies and to the telephone company.

That the efforts to reduce the height of poles used in pole line construction and reconstruction have been somewhat successful is shown by the fact that in the year 1909 only 11 per cent. of the chestnut poles purchased were as short as 20 feet in length, while in the year 1910, approximately 28 per cent. and in the year 1911 approximately 48 per cent. of such poles were 20-foot poles. Data is not at hand covering cedar poles, but from a general knowledge of the situation it can be said that we have been successful in reducing the average height.

In the guying of pole lines many changes have been made. It was formerly the practice on gradual curves to make each pole a corner pole and to guy each pole. In the new work we have required that along gradual curves the line shall consist of corners and straight section. In that way we have reduced the amount of guying necessary and have also provided a stronger line.

As far as practicable copper wires are now placed at the top of the pole and iron wires below the copper wires. The copper wires are being placed so that they are adjacent and can be transposed, not only for physical telephone circuits but also to create phantom telephone circuits. The methods of stringing and tying copper wire have also been changed It is now required that copper wire be given a definite sag depending upon the span length and the temperature at which it is being strung, while previously it was the practice to string the copper wire without much regard to temperature and span lengths. Previous practice resulted in many cases of wire troubles, due to the wire breaking during cold weather, the copper wire having been strung too tight. By following the specification requirements as regards sag, most troubles due to wires breaking on account of cold, should in the future be obviated.

The method of tying the copper wire to the insulator has also been changed. It was previously the custom to carry both ends of the tie wire under the line wire and then cross over and make the necessary wraps by means of a wrench. This method of tying was productive of two kinds of trouble. Owing to the fact that both ends of the tie wire were carried underneath the line wire and then crossed, it was possible for the tie to unwrap and loosen upward strain the other end of the tie tends to tighten.

Under the present method of tying, one end of the tie wire is carried over the line wire while the other end is carried under before they are crossed and the wraps commenced. With this method of tying there is no tendency to unwrap in case of strains on the wire, as under a downward strain one end of the tie tends to tighten up, while under an upward strain the other end of the tie tends to tighten.

The use of a tie wrench also resulted in a large number of line troubles. The hard drawing of copper wire produces only a skin effect and the slightest nick or scratch or kink in the line wire reduces the strength from that of hard drawn copper to that of soft drawn copper. The use of a tool in making the wraps often scratched or nicked the wire reducing its strength approximately 50 per cent. The present method of tying requires five handmade wraps, no tool of any sort being allowed. In order that the wraps may be made by hand the length of the tie wire has been increased considerably over that formerly in use.

In the recent pole line specifications the method of attaching double arms to poles has been changed, and furthermore, the use of double arms has been restricted as far as is practicable. The changes in the method of attaching double arms provides for the use of cross arm bolts instead of the usual double arming bolt and results in stronger construction. The restricting of the use of double arms is in order to increase the transmission efficiency of the telegraph and telephone circuits carried on the pole lines. Each insulator during wet weather is a point of leakage and part of the low insulation on telegraph and telephone circuits in the Western Union plant has been due to too great a use of double arms at points where their use was not a necessity.

In construction and reconstruction work strong effort is being made to keep the amount of rubber cable used, down to a minimum. There is nothing more injurious to telegraph or telephone transmission than the insertion in such circuits of long lengths of rubber cable. It will always be necessary, of course, to carry wires in and out of railroad stations by means of short lengths of rubber cable.

While not absolutely correct the K. R. law is approximately correct as regards the efficiency of different types of cable from a telegraph transmission standpoint. In other words, the telegraphic efficiency of cables depends on the total resistance of the conductor in ohms multiplied by the total grounded capacity of the conductor in microfarads. The higher the product of the resistance and capacity of a conductor the less efficient it is from a telegraph transmission standpoint.

From measurements made on rubber insulated cable and on paper insulated cable it has been found that the average capacity to ground per wire per mile in the case of rubber insulated cable is approximately .62 microfarads, while in the case of paper insulated cable the average grounded capacity per mile per conductor is approximately .10 microfarads. Comparing No. 14 B. & S. gage rubber insulated cable with No. 14 B. & S., gage paper insulated cable, it is seen that one mile of rubber is as serious a detriment to telegraph transmission as approximately 2½ miles of paper cable, or 10 miles of rubber cable affects telegraph transmission approximately as seriously as 25 miles of paper cable. Comparing No. 14 B. & S. gage rubber insulated cable with 210 pound copper wire the capacity to ground per mile of which is approximately 0.15 microfarads, it is seen that one mile of rubber cable is as serious a factor in telegraph transmission as approximately 130 miles of 210 pound copper wire. The serious effect of rubber cable on telegraph transmission is plainly shown by the above approximate figures.

Practical Subjects—Letters and Discussions

A New Species of Eavesdropper.

No one hates eavesdroppers worse than we do. Eavesdroppers are certainly pests and nuisances, and should be wiped off the face of the earth. They must be contagious as they certainly multiply rapidly and if not fought, everyone will be infested with or affected by them.

Not long ago, the writer went to repair a telephone and, in examining the receiver, found two full grown bed bugs. Since bed bugs have the habit too, we will just consider eavesdroppers and bed bugs on a level and fight them both alike.

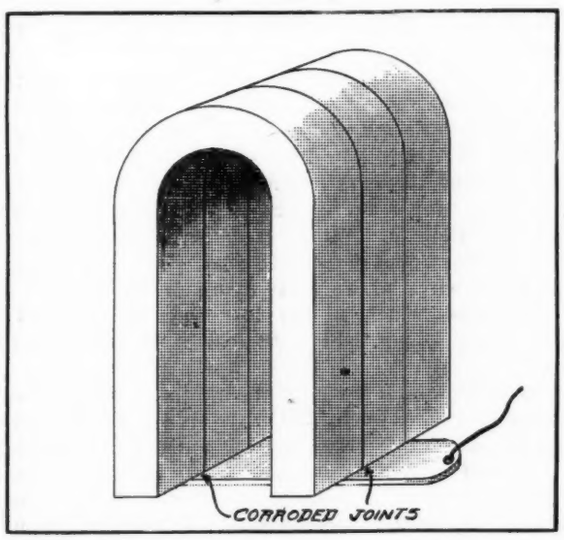
Southern Telephone Manager.

A High Resistance Joint in Generator Circuit.

One day I found on my desk a magneto test set, accompanied by a note from the line foreman requesting me to fix the set. He said one of the main faults was that he was unable to get the exchange on the long country lines. By ringing hard he could raise the operator on the short lines.

Thinking that the magnets of the generator had become weak, he left an extra generator handy so that in case of necessity I could easily replace the one under inspection. Looking over the connections and contacts as a preliminary, we found that they were all good. In removing the generator from the box in order to give it a more thorough examination, the source of the trouble was located.

The generator rests upon a strip of brass, one end of which is connected to the ringing circuit. It seems that the binding screws which held the generator to the wall of the cabinet had become loose. Water had gotten in between the base of the generator and the brass strip, causing both to corrode and cre-



Cause of Trouble in a Magneto Test Set.

ating a high resistance joint. Water, iron and brass or copper will soon cause trouble in a circuit.

By use of a little sand paper on the brass strip and the base of the generator, the trouble was soon cleared.

Nottingham, Ohio. J. W. Hepner.

The Magnetism of Permanent Magnets.

At the summer meeting of the Institution of Electrical Engineers, held in Glasgow, Scotland, last month, a most interesting paper was presented by Professor Silvanus P. Thompson on the subject of "The Magnetism of Permanent Magnets."

In beginning the lecture Professor Thompson paid a tribute to Lord Kelvin and made a brief reference to his classical work on magnetism, according to the account published in The Electrician. He also mentioned the importance of permanent magnets, stating that it was scarcely realized what advances had recently been made in that subject. If one were to collect the researches of the last 25 years on magnets, it would be a work worth doing. It had lately been ascertained that an alloy of cobalt and iron had a greater susceptibility to magnetism than any material known, but its possibilities had yet to be investigated.

The lecture was divided into the following divisions: The quality of the steel employed; its shape and dimensions; the heat treatment; the method of magnetizing, and the safeguards adopted for securing permanency.

In the first place, by means of the hysteresis loops for an annealed steel wire and for a "glass hard" steel wire, it was shown what an enormous difference there was between the residual magnetism and the coercive force of these two materials. In the case of the soft steel, the magnetism was easily induced and there was also a large remanence, but, on the other hand, there was little coercive force, the soft steel being easily demagnetized. A good steel for magnet purposes should give a value of "I" of 1,000 and a coercive force of —50.

The effect of the percentage of carbon on the coercive force was illustrated by diagrams; and by means of microphotographs, the lecturer clearly explained the effect of increasing the percentage of carbon on the proportion of pure iron, pearlite and cementite present in the steel. With high percentages of carbon, cementite crystals appeared, while in steels heated above the temperature of transformation, martensite and austensite were formed, these constituents or structures being preserved by sudden quenching. Below 0.9 per cent. of carbon it may be said that annealed steel consists of ferrite and pearlite; at 0.9 per cent. it becomes pearlite; and above 0.9 pearlite and cementite. The relation between the composition and the physical states at different temperatures was next discussed, and in connection with this the effect of the composition on the temperature at which magnetism disappears.

Dealing with the question of size, Professor Thompson laid emphasis on the advantage of using long bars for magnets, owing to the demagnetizing effect of the poles in the case of short magnets. He mentioned Kelvin's mode of impressing this fact on his students, viz., "Short bars and spheres have no memory, but long bars remember well." From a diagram it was seen that what Professor Thompson termed the "coefficient of demagnetization," varied from 1.2 per cent. in the case of very short bars to 0.5 per cent. in the case of a cylinder whose length was 25 times its diameter. A further advantage of the long magnet is that it is not affected to the same degree by a rise of temperature. In this connection the superiority of tungsten steel was also noticed.

The lecturer next took up the question of cooling curves and "points of arrest." A temporary increase of temperature occurs as steel or iron cools when it reaches these points of arrest, due to recalescence. In the case of pure iron there are two such points, viz., 860 deg. and 750 deg.; mild steel shows three points, 820 deg., 730 deg. and 690 deg.; medium hard steel three, at 760 deg., 710 deg and 690 deg, and high carbon steel only one, 690 deg. Three distinct allotropic forms or phases of iron are concerned in these ranges of temperature; alpha iron, which is soft and magnetic, and normally exists below 750 deg.; beta iron, which is non-magnetic, between 750 deg. and 860 deg., and gamma iron, which is hard and non-magnetic, above 860 deg.

The effect of the rate of cooling, and the effect of the temperature at which the steel is quenched, on the remanence and

coercive force next received attention, as well as the effect of different percentages of carbon. In this connection the following typical figures were cited:

	Remanence.	Coercive force.
Soft (annealed) steel	85	8
Quenched at 705 deg. in magnetic state.	130	14
Quenched at 770 deg. while non-magnetic	410	52

Mean specific magnetization. $\delta =$

State of temper.	Hardness.	10	20	40	50
Glass hard	45.7	23.5	37.6	46.5	48.3
Straw tint	26.3	21.4	40.2	53.8	56.5
Blue tint	20.5	19.3	45.8	80.4	87.3
Annealed soft	15.9	4.3	11.2	31.8	44.6

In the above table δ represents the ratio of length to diameter. The result of heating tungsten steel for some hours at 900°C. was a higher remanence and a lower coercive force. The result of quenching, however, was to give the high value of 72 for the coercive force.

An important feature brought into prominence by some tests on Allevard (tungsten) steel, was that with prior heating to a high temperature, one can quench at a comparatively low temperature and still get a very hard material. The temperature of quenching can, indeed, be as low as 550°C. to give this result. The effect of putting tungsten into steel is to lower the temperature of the recalescence point. Manufacturers were not generally aware, the lecturer stated, that a better effect could be obtained by heating up the tungsten steel to a high temperature, and letting it cool to a point just above the lowest recalescence point before quenching.

In connection with the decay of magnetization it was mentioned that such decay occurs more slowly at a uniform temperature than if the steel is exposed to changes of temperature. Steels with a large coercive force are found to lose their magnetism more slowly than others. An advantage of long magnets, Professor Thompson stated, was that these lost less magnetism under rough treatment than did short magnets; indeed, the power of long magnets always decayed less than in short magnets under similar circumstances. Magnets are matured (that is, brought into a steady condition) by the lapse of time, by mechanical shock, by gentle reheating or repeated warming, or by partial demagnetizing. Various practices were followed in each case. Thus, some people said that it was best to heat for 24 hours in steam at 100°C., whilst others preferred repeated heating to 60 deg. At any rate, one thing was certain, namely, that repeated carrying through a certain small cycle of demagnetizing influences was beneficial as regards permanency.

In conclusion, Professor Thompson mentioned that although Sheffield steel makers were fully alive to metallurgical questions, they had not yet given the same attention to the solution of magnetic problems. Among such problems requiring solution were: The effect of varying the proportion of carbon in tungsten steels, the action of molybdenum and vanadium with tungsten in steel, and the effect of heat treatment.

Why the Telephone Rates Increase.

A matter which many subscribers cannot understand is the reason more money is not made, as the number of telephones increase. The telephone business is like any other business.

When the exchange had 100 telephones, the rates were $2.50 for business and $1.50 for residence telephones. Now the subscribers have connection with about 600 telephones. They get more service for their money with the greater number of telephones, do they not? The expenses of the company are greater as more operators, poles, cross arms and wire are required. As the town grows, the lines are longer and the cost per telephone is greater.

With the grocer or baker, the more butter, bread, etc., he sells, the more money he makes. But his business is in one square room while the telephone business covers the whole town and every line has to start from the exchange. If, we sold telephone service by the call, we would make more money on 600 telephones than we did on 100 telephones. As it is now on a flat rate, you lose money in a town of 5,000 people, with 600 subscribers.

Just think of the service we give other people who use these telephones and we get nothing more for it than the flat rate of $2.50 and $1.50. Before closing the subject we are getting an increased rate.

TO WIRE CHIEFS AND MAINTENANCE MEN.

Clearing of troubles which occur in your exchange, inside or outside, may be made the subject of short, practical letters which will interest other telephone men These* TELEPHONY *will gladly publish, if illustrated by diagrams or photographs. Simply write a description of the nature of the trouble, tests and location, cause found, and method of repair. Payment will be made for all letters published.

You cannot figure the telephone business like the electric light, water or gas. All these companies run wires and pipes to the curbstone and are paid for wiring and piping the houses. The telephone company runs the line, wires the house and furnishes the telephone, all on the monthly flat rate. Moving telephones cost money and is a losing proposition as the company never gets what it really costs. If lightning burns out a telephone, if electric wires damage it or if it gets out of order, the telephone company stands all the expense. On the other hand, if the electric light burns out or the wires get out of order, the patron stands the expense.

This discussion applies to our Lakeland exchange as we see it. The writer has met telephone men from the North who have not agreed with me. I figure 10 per cent. for depreciation, and 8 per cent. for the investment, but this is too low on the risk run against fire and tropical storms. After arguing with them, these telephone men were convinced that I was right. I gave them to understand that the poles last about 15 years in the North, in Florida, seven years. In the North, the ground is frozen six months out of the year, while in Florida it is never frozen and the insects eat the wood the whole year. The salt air and rain rust the wires so we must figure on depreciation as I stated above, which is too low. Our increased rates will pay nearly 5 per cent. with which we will be satisfied.

The rates now are fixed by the railroad commission—heretofore they were set by the city council. I believe that the commission is the better for the telephone companies.

It is a hard matter to convince a city council to grant an increase in rates. A telephone company, being a public service corporation, sometimes makes enemies through operators of other employes. If this enemy gets on the city council or has influence with it, the ordinance for increased rates will not pass. I have experienced this and found it true. The railroad commission is unbiased by other people and a telephone company stands more chance of getting an increase in rates.

Lakeland, Florida. A. D. Leonard,
Manager, Peninsular Telephone Co.

Railroad Must Install Telephone in Depot.

Judge E. Ray Stevens, in the circuit court at Madison, Wis., has sustained the action of the Railroad Commission in ordering the Chicago & North Western Railway Co. to install a telephone at its depot at Fox River. The court held a telephone is necessary for public convenience.

Sparks from the Troubleman's Department

Lines By An Old-Time Telegrapher.

The following verses were written by James Barton Adams, a telephone and telegraph operator, seventy years of age, who has just returned to the telegraph business, after a long absence, as manager of the Postal Telegraph-Cable Company's office at Rawlins, Wyo. The verse was sent TELEPHONY through the courtesy of Charles H. Jett, who is with the Postal at Denver:

JIM MCCOMB'S 'DOPTED BOY.

A gawky an' awk'ard little cuss
That didn't amount to much with us,
A 'dopted son of ol' Jim McComb
Who tuk him out of a orphants' home
Through pity, he said, but we reckoned Jim
Looked more at the work he'd git outen him,
An' he worked the lad to the limit, more
Than many kids o' his size'd bore.

We never thought he'd amount to shucks,
An' 'twas said around 'mong us oldish bucks
That he never'd be no earthly good
'Cept fur chorin' 'round an' a-splittin' wood.
The boy was willin', an' ust to say
He wouldn't always slave that-a-way;
That some day he reckoned he'd make his mark—
An' we'd snicker to hear the young pup bark.

When ol' Jim h'isted his anchor and
Sot sail fur the shores o' the Promised Land
The lad was free from his tyrant boss,
An' he shed no tears at his griev'ous loss.
'Twas the turnin' p'int in his life, he said,
An' he'd now carry out the plans he'd laid,
An' we heerd the news with a sneery laugh
That he was a-learnin' to tellygraph.

He disappeared, an' we later heerd
That fate, or somethin' like that, had steered
The cuss to the West, where the mountains rise
An' tickle the ribs o' the archin' skies.
He'd got a job with the Postal and
Was shootin' lightnin' to beat the band,
An' was saltin' more filthy lucre down
Than we ever had seed in this dam town.

Then come the news in the paper that
Ol' Jim McComb's former little brat,
Because o' his brainworks, had bin picked
To superintend a big dees-trict.
He'd married a mine king's darter, and
Was one o' the big bugs o' the land,
An' mebbe, the paper went on to say,
He'd be Postal president some fine day.

Are we sneerin' at that cuss now? Well, no—
We're all of us sayin': "I tol' you so!"

The other day after a telephone in the house of a well-known citizen had been out of commission for several days, it was fixed. The operator rang up the place to make a test.

Only a colored woman servant was present, and she told about it later.

"Yas sir, dat phone rang and somebody asked me ter ring up 'trouble.'"

"Well, what did you do then?" she was asked.

"What did I do den? Why I hung it back up for I'm not er hunting trouble and surely ain't gwine ring it up. I gits enough trouble that jes hunts me up."

A Chicago paragrapher says: Dr. Tryon of Murdock, Minn., advertises, "Office, residence, and telephone same as Dr. Dowswell used." And likely the same kit of dope, adds the writer.

Before and After.

This is
the way
that he
went home
before
he took
a wife.
He was
on deck
for joy-
rides or
whatever
else was
rife.
He was
out late
six times
a week
and led a
frisky
life.

But now
he goes
straight home
like this,
and stays
there, you
can bet.
He's had
to learn
a thing
or two
he never
will
forget.
He dares
not stay
out late
because
he wed
a suffra-
gette.

—R. K. M., in Judge.

Courtesy Mountain States Monitor.

A Telephone Suffragette.

And Good Ears.

A nose for news has Auntie Bliss
That's really something fine;
She gets the things the papers miss,
She's on a party line.

—Chicago Tribune.

Legal Cases and Decisions

By A. H. McMillan

Compensation for Use of Streets.

The city of Springfield, Ill., adopted an ordinance compelling the payment of $1 per year for each pole or post occupying any portion of a public street, alley or sidewalk, "as remuneration to the city." The city was presumed to own the fee, or title to the land constituting the streets of the city.

The Postal Telegraph-Cable Co. refused to pay the rental, claiming that it was illegal, and that the company already had a franchise from the city. The statutes of Illinois provide that no telegraph company shall erect any poles within any city, town or village, without the consent of the corporate authorities. Under the act of incorporation of the city, the council was given the exclusive control of the streets, alleys and highways of the city, and the power to regulate the same, and also to prevent the using of streets, sidewalks and public grounds for telegraph poles.

The court upheld the ordinance imposing the rental, holding that the company had a license or permission from the city to use the streets, and not an irrevocable grant or franchise, and that under the circumstances the city had a right to impose a reasonable rental for the exclusive use of the parts of the street occupied by poles. It was held that the ordinance would be presumed to be reasonable in the absence of a showing to the contrary, the burden to so show being on the company.

The ordinance was also held to be not invalid against the company because it was doing an interstate business and had made use of the federal Post Roads Act, granting to telegraph companies a right of way over public lands and military and post roads. City of Springfield vs. Postal Telegraph-Cable Co., 97 Northeastern, 672.

Lightning and Oil.

A company operating an oil pipe line and also a telephone line on poles, immediately over, and following the direction of, the pipe line was not required to anticipate that its employes, working about the pipe line, making repairs, would be injured by ignition of oil by lightning striking the telephone wire and passing to the ground through the arresters on poles. So held the Texas Court of Civil Appeals in an action brought for an injury to an employe from such an accident.

It was also held that the company operating the pipe line and telephone line was under no duty to warn employes engaged in making repairs on the pipe line, that lightning might strike telephone wires, pass down arresters on the telephone pole and ignite oil standing in pools on the ground.

Employes were held to be chargeable with notice of the law of nature that gas arising from crude petroleum rarifies the air and produces a point of low resistance so that a bolt of lightning, descending to the earth, will follow the trail of the gas, and that if the employe is working at the point of origin of such gas, a pool of oil in which he is standing may be ignited by the lightning. Butler vs. Gulf Pipe Line Co., 144 S. W., 340.

Enforcing Obedience to Rules.

The Southwestern Telegraph & Telephone Co. at Little Rock, Ark., had a rule for the denial of service to any subscriber who had refused to pay for past service. It refused service to a subscriber under such circumstances, and the subscriber took the matter into court. There the counsel for the telephone company contended that there was no discrimination because the company enforced its rule, even though unreasonable, against all who refused to obey it.

The court held that this argument was fallacious and that the company could not refuse to furnish telephone connections to a subscriber who had refused to pay for past service. The company also had a rule that resident subscribers should receive a discount on payment before a designated day.

This rule was held not to justify the company in discriminating against a subscriber offering to pay up current service before the designated date, merely because he was in arrears for past service. Southwestern Telegraph & Telephone Co. vs. Danaher, 144 Southwestern, 925.

Commission May Raise Franchise Rates.

The Independent telephone company was doing business under a franchise from the city of Seattle, Washington, which limited the rates the company might charge. In June, 1910, a patron of the company complained to the railroad commission, alleging insufficient service and that the company's rates were insufficient to support a proper service.

A hearing was had, and after a physical valuation of the company's property, an order was made directing the company to inaugurate a new schedule of rates, which were somewhat higher than those fixed by the franchise. The rates were put in force soon thereafter and their collection was enjoined by suit at the instance of the city of Seattle. The state then interfered and commenced proceedings before the supreme court to prohibit the superior court of Kings county from interfering with the carrying out of the order of the commission.

The supreme court, on a hearing of the case, held that the law establishing the commission and fixing its authority, superseded the franchise of the city of Seattle. The court also held that the franchise was not binding on the state as a contract within the contract clause in the federal constitution, but that the franchise was in the nature of a license and subject to the exercise of the sovereign power of the state. The constitutionality of the legislation was also upheld.

This further significant ruling was made: that the right of the state to regulate telephone rates is subject to the limitation that the rate fixed will afford a fair interest alone on the investment after allowance for depreciation and upkeep and legitimate cost of operation. State vs. Superior Court, (Wash.) 120 Pacific, 861.

Rights of Telephone Companies on Post Roads in Georgia.

The Court of Appeals of Georgia has held that a telegraph company engaged in interstate commerce under the so-called Post Roads Act, by virtue of its written acceptance of the act, has a right to operate along the public or post roads of any county in the state and to occupy these roads with its telegraph poles. "This right," said the court, "is to be enjoyed in subordination to the public use of such roads, and subject to any lawful exercise of the police power of the state or county, so that travel should not be unreasonably obstructed, or the public rights unreasonably interfered with."

"The state cannot," continued the court, "by any of its authorities, prevent such a corporation from placing its lines and poles along the post roads or routes, or stop

the use of them after they are so placed. The limit of the power and authority of such county officers is the regulation of the manner in which the right given by congress shall be exercised by such a corporation."

The decision was given in the case of the conviction of an agent of the Postal Telegraph-Cable Co., who removed poles from the middle of the public road. Carver vs. State, 74 S. E., 556.

Inheritance Tax on Telephone Stock.

County courts in Kentucky do not have jurisdiction to ascertain inheritance taxes on the stock of a telephone corporation owned by a non-resident decedent. This was the holding of the Court of Appeals of Kentucky in a recent case. Commonwealth vs. Cumberland Telephone & Telegraph Co., 142 S. W., 392.

Contributory Negligence.

Where a person driving along a turnpike, saw that a telephone wire had been disconnected from the insulator on a cross arm of a pole, but that it had not been wholly separated from the cross arm, he was not negligent in attempting to pass the same point about dark on the same day, without stopping and looking to see whether the wire had fallen in his absence. Synthiana Telephone Co. vs. Asbury, 143 S. W., 1050.

Large Demand for Telephones in Japan

The subject of telephones in Japan is again attracting much attention says the Japan Weekly Mail. It appears that the government is quite unable to meet the applications for this useful instrument. So greatly does the demand exceed the supply that in Tokio alone more than 10,000 applicants are patiently waiting until their turn comes, which may not be for several years hence.

Of course it is possible to buy a telephone in the open market, and there are agents who undertake to make these purchases. But the price is at least 350 yen. All sorts of devices are resorted to by these agents, and the main part of the benefit accrues to them. As a device for public convenience it was recently decided that any one applying for a telephone in Tokio between certain dates would have his application taken into consideration, and if every thing was straightforward he would receive a telephone on payment of 185 yen. There is a limit fixed, however, namely, 3,500 instruments.

If the applications exceed that number the old deadlock will be re-established. In the case of Yokohama the maximum number is 560 and the price 135 yen. The equivalent of a yen in American money is 49.8 cents.

To Establish Constantinople System.

The concession for the establishment of a telephone system in Constantinople, Turkey, has been definitely awarded to H. Laws Webb, representing an international syndicate. The consent of parliament is, however, required before the contract is finally signed.

The negotiations of which this concession will be the ultimate outcome were opened in October, 1908, when Mr. Webb, first approached the Turkish government with a proposal to establish by private enterprise a telephone system in Constantinople. The disturbed condition of the country was, however, pre-judicial, and it was not until the end of 1909 that the project was approved, subject to the consent of the minister of finance, and the commission appointed to deal with the subject.

The scheme includes the provision of an exchange which will in the first place be equipped for 10,000 subscribers. The area to be served extends over about 150 square miles, comprising the whole city and suburbs, including Stamboul, Para and Galata, Scutari and other places on both banks of the Bosphorus, as well as the numerous resorts on the Sea of Marmosa as far as San Stephano.

About One of the Alabama Companies.

In a letter to TELEPHONY, J. A. Miller, manager of the Miller Telephone Co. of Fruitdale, Alabama, gives a short history of its telephone business.

Among other things, he says:

"Our exchange was started about 1902 by A. F. Smith, with twenty telephones. From the time it was started,

The Exchange of an Alabama Independent Company.

until March 1, 1906, it had been owned by Charles Stover, C. W. Enerman and James Weaver, and had grown to 40 telephones.

"Since our purchase in 1906, the system has grown from 40 to 90 telephones. We also have exchange connection with Leakesville, Miss.

"Our system covers Fruitdale, Escatawpa and Tibbie, Alabama. Our rates are from $1 to $1.50, according to service. During the last year we reset about 300 poles, many being cypress and some pine.

"The photograph of our home and office was taken January 31, 1912. We are growing slowly but surely."

Bell Forbidden to Use "Telegram" Code Word.

An order has been issued by the New York Public Service Commission forbidding the New York Telephone Co. to use the word "telegram" as a call word for the Western Union or any other telegraph company in that state. The telephone company is directed to assign call numbers to the Postal Telegraph-Cable Co. and the Western Union as it does to other subscribers to its service, and in addition to assign the word "Postal" as a call word for the Postal company and the words "Western Union" for the Western Union company.

The call word for each company is directed to be printed in the subscribers' directories of the telephone company hereafter issued, so as to show clearly that a person desiring to send a telegram over the lines of either telegraph company may call that company by the call word. The telephone company also is required to make a rule for its employes that in no case shall the word "telegram" be recognized as a call word or to advise which company to call.

The New York Telephone Co. is required to notify the commission on or before July 22 whether the terms of the order will be complied with. The order resulted from a complaint made by the Postal company, alleging that the use of the word "telegram" as a call word for the Western Union was unjust, unreasonable and discriminatory. The commission upheld this contention.

From the Patent Office

By Max W. Zabel

Receiver Holder.

H. W. Schussler, Philadelphia, Pa., 1,030,684, June 25, 1912.

Automatic receiver holding means for a desk telephone comprise a base portion mounted in two halves, adapted to encircle the base of the desk telephone. This base portion carries a standard upon which the receiver is adjustably mounted. Means are also provided to actuate the switch-hook lever.

Intercommunicating Telephone Systems.

E. R. Corwin, Chicago, 1,030,505, 1,030,504, June 25, 1912; assigned to Corwin Telephone Mfg. Co., Chicago.

In the intercommunicating systems described, switching devices are provided at each station for connecting the station to any other station. These switching devices are so controlled that a busy test is given the calling station, should the called station be busy. They also lock out the calling station, should it seek connection with a line which is in use.

Receiver.

Wm. P. Stunz, Lansdowne, Md., 1,030,550, June 25, 1912; assigned to G. R. Webb, Baltimore, Md.

A lever tends to place the receiver diaphragm under tension, due to the pull of a permanent magnet. The receiver electromagnet acts on the same extremity of this lever as that on which the permanent magnet acts, to cause the response of the diaphragm to the impressed current.

Transmitter.

Wm. P. Stunz, Lansdowne, Md., 1,030,551, June 25, 1912; assigned to G. R. Webb, Baltimore, Md.

This transmitter is designed with a view to preventing overheating of the carbon granules and the consequent reduction in resistance due to such overheating. The shell or cover of the transmitter forms a hollow chamber adapted to receive a cooling agent such as water. This cooling agent cools the fixed electrode, the cooling thereby extending to the granular carbon.

Switchboard Cord Shortening Device.

W. F. Weyranch, Chicago, 1,030,040, June 18, 1912.

The device comprises a pair of substantially rectangular metallic plates spaced apart and secured to the under side of the switchboard cord rack adjacent the ends of the line of cords depending from the later. A plurality of notches, equally spaced, provided in the vertical edges of the plates, serve as rod sockets, a plurality of rods bridging the space between the plates and adapted to be removably secured in the sockets. The switchboard cords are passed across the rods which are so placed as to give the cords the proper length.

Central Office Apparatus.

H. O. Kabitzsch, Hamburg, Germany, 1,030,308, June 25, 1912; assigned to Gustav A. Meyer-Henniger, Hamburg.

A plurality of keys is described which, in co-operation with unlike resistances, control the actuations of a device similar to a voltmeter to reproduce the number desired at the receiving station. The apparatus at the central station under the control of the voltmeter, comprises a fixed wall and a displaceable plate, each provided with a plurality of segmental slots. A plurality of segmental numeral bars, adapted to be successively adjusted in the slots by the successive oscillation of the index of the voltmeter, are also provided in combination with means for locking the numeral bars in their adjusted positions to give visual indication of the number desired.

Party Line System.

W. W. Hawkins, Cleveland, Ohio, 1,030,089, June 18, 1912.

A selective signaling system is described in which the ordinary number of harmonic signals on a given line may be doubled by using different polarity. Two ringers of the same frequency are so arranged that one will operate with one polarity and the other with the other polarity. The magnetic circuit for the ringer consists of the armature and electromagnet and a permanent magnet, all of which are in series, forming part of the same magnetic circuit.

Impulse Transmitter.

J. W. Lattig, Rochester, N. Y., 1,030,412, June 25, 1912; assigned to American Automatic Telephone Co., Rochester.

A calling device for automatic intercommunicating systems is described which includes a controller adapted to change the circuit conditions through circuit terminals. The operating mechanism for the controller is arranged for setting to varying positions. Means are also included for returning this mechanism to its initial position and for connecting the controller with the operating mechanism during its return movement. Co-operating stops are then provided movable with the controller and operating mechanism respectively for arresting the operating mechanism in its initial position.

Automatic Switch.

E. E. Clement, Washington, D. C., 1,029,590, June 18, 1912.

In this automatic switch the working parts and the contact banks are mounted within the same frame. It is also so arranged that side switches need not be accommodated as these are controlled by ordinary relays separate from the switching devices. Novel pawl arrangements are also disclosed. A further object of the invention is to provide a switch structure in which certain of the moving parts are less liable to damage since they are not projected beyond the frame in their shifted positions. To this end a sleeve is provided capable of longitudinal movement along a shaft, the latter being stationary and the former being designed to carry wipers for engagement with the contacts in the contact banks.

Electrical Automatic Switching Apparatus.

E. E. Clement, Washington, D. C., 1,029,591, June 18, 1912.

This invention is designed to provide switch units, each of which is interchangeable with every other unit to permit economy in manufacture. The parts of each unit are mounted on a perfectly flat skeleton frame and a unit section or cabinet is provided, into which the frames may be slid edgewise. Upon the back of each unit section or cabinet, contact strips of the switches are mounted, these being straight strips containing perferably one hundred sets of springs with platinum points for all contact points included in the talking circuit. The switch frames are provided with guides so they will automatically align with the contact strips. All wire connections are made to the contact strips on the back and outside of the sections.

From Factory and Salesroom

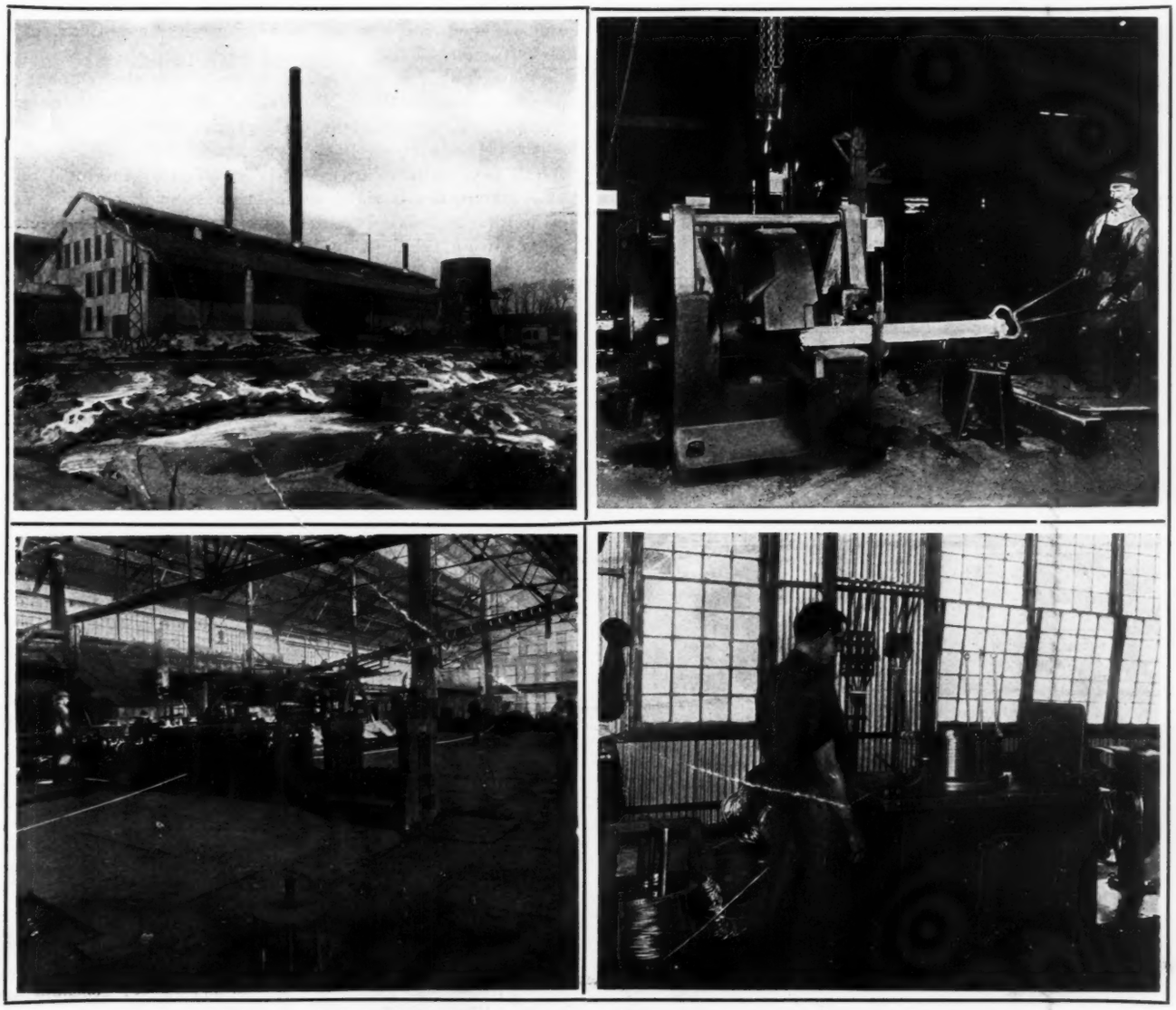
The Manufacture of Copper Clad Wire.

Since 1860 attempts have been made to form a satisfactory electrical conductor by welding together copper and steel. It was not until after 1902 that a satisfactory process was discovered, in which year John Ferrol Monnet who had devoted many years experimenting with various processes, came from France to this country.

In November, 1905, the Duplex Metals Co. was organized and incorporated to manufacture copper clad wire under a process developed by Mr. Monnet. The first wire was manufactured at Chester, Pa., in an old rolling mill, which was afterwoods purchased by the company. This mill has been replaced by an up-to-date fireproof structure, having an annual capacity of over 25,000,000 pounds of wire.

In the manufacture of the wire, pure copper is welded to steel through intervening layers of iron-copper alloys. A description of the process used for making the wire is most interesting. Steel billets are rolled to a bar, which is cut into other billets. These are then passed to a machine, where the ends are drilled and tapped. After pickling and washing, the billet is heated to a given temperature and drawn up into a mould, also previously heated, by means of a rod, screwed into one end. This rod slides up and down in the center hole of a three-jawed chuck which holds the mould and centers the billet in it.

The mould and billet are now carried to a furnace of special design, which contains molten copper at a very high temperatures. The billet is lowered out of the mould and into this copper, and kept there for a time sufficient to form an alloy on the surface of the steel. It is then drawn up into the mould and the whole carried to a second furnace containing the purest of commercial copper.



The New Mill of the Duplex Metals Co.—Shearing the Billets—View in the Rod Mill—Drawing the Wire.

This copper is poured into two openings in the top of the mould the bottom of which is closed by a flange, and unites with the alloyed area and fills the mould. When the copper has set, the chuck and rod are unscrewed and the copper clad billet taken out of the mould. After the necessary preliminary heating, it is rolled to any desired size or shape.

The wire used with or without insulation is always drawn so as to obtain the highest possible tensile strength. The drawing of the wire is carefully supervised so as to produce the best wire possible.

(Continued on page 44, Advertising Section.)

In the Rural Line Districts

The Rosendale Telephone System has been sold by Stephen Lawson to Carl Gruett, who took possession in May. —Rosendale Item Ripon (Wis.) Press.

The telephone people under the direction of Mr. Hungerford of Billings, have nearly completed the establishment of the local service for Cody. Nearly every business house and a number of the residences have had boxes placed in them, and in a few days the local exchange will be ready for business.—Cody (Wyo.) Enterprise.

There is quite a lot of talk of establishing a telephone exchange in Seneca. We hope the talk will develop into the real thing. Nothing would be more of public convenience than a good telephone exchange connecting all the country lines with a central office. Why not have a meeting and get in action?—Seneca (Neb.) Clipper.

All telephone lines from the east and south running into Prairie Home have rebuilt their lines and are now in good shape.—Prairie Home Item, Boonville (Mo.) Republican.

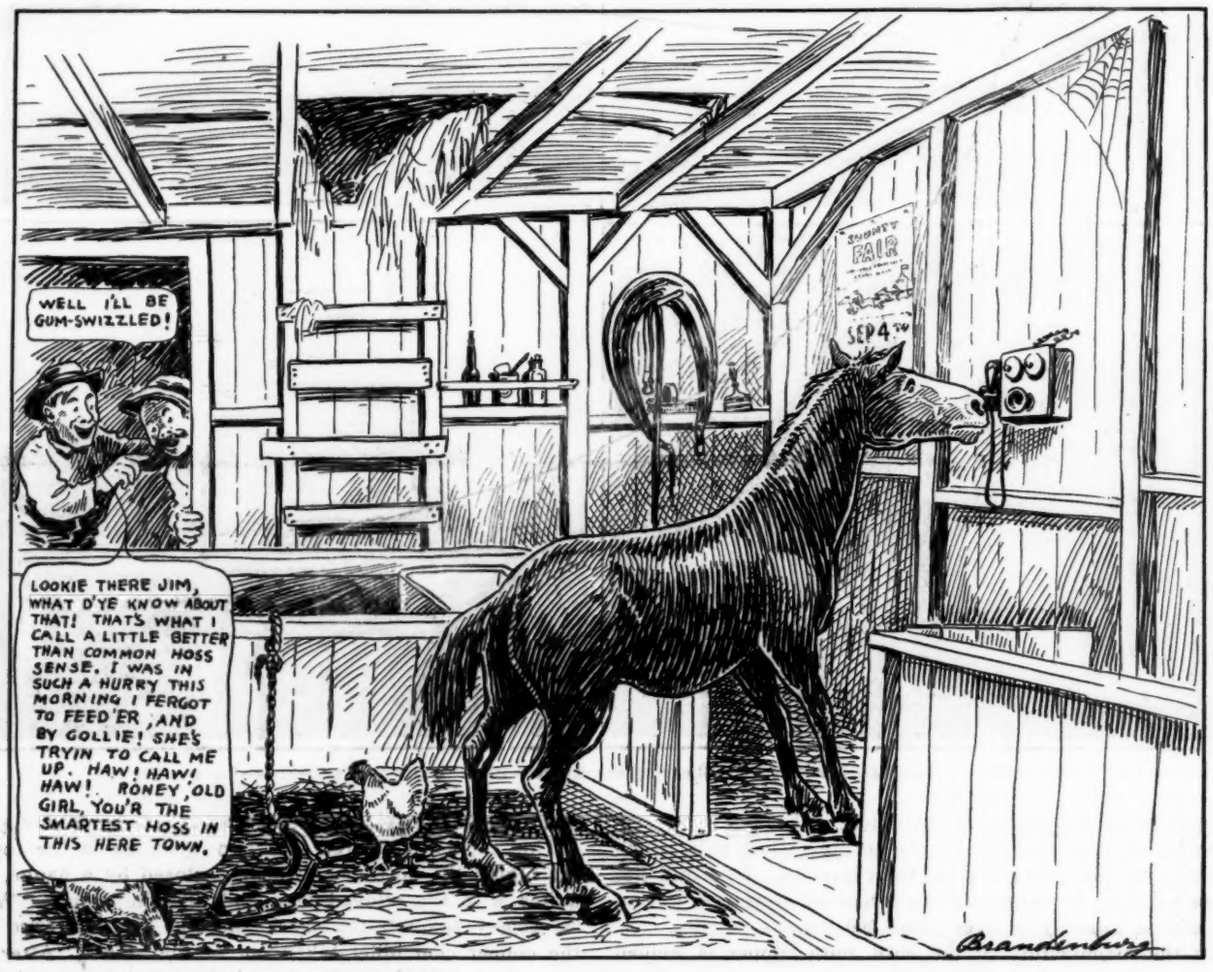
Charles Coffman, with a crew of helpers, came up from Clinton Tuesday to repair some of the National Telephone and Electric Co. cables, which have been giving trouble, and make other needed repairs at and near the central office. The condition of the defective cables is partly charged to small boys and air guns, the theory being that the boys have shot holes in the lead casing of the cables, which admit water and this causes short circuits and cross talk.—Farmer City (Ill.) Journal.

The Bridge Creek Telephone Co. have put in new posts and fixed up the line generally and are expecting to have fine service after this.—Bridge Creek News, Hale (Mo.) Leader.

The Ludlow telephone company held a meeting recently and planned for the purchase of new lines.—Champaign (Ill.) Gazette.

Our neighbor town, Orland, is hustling. She is about to purchase and establish a Farmers' Mutual Telephone exchange, which the people of Lagrange county are glad to learn.—Mongo Item, Ft. Wayne (Ind.) Gazette.

The new switchboard recently installed by the local telephone company is right up to business in efficiency. You no longer are treated to the monotonous hum of the electric plant during the lighting service hours. Induction and cross talk may be a good thing in its place but it is a nuisance on the talking wire.—Prairie Du Chien (Wis.) Union.


WELL I'LL BE GUM-SWIZZLED!
LOOKIE THERE JIM, WHAT D'YE KNOW ABOUT THAT! THAT'S WHAT I CALL A LITTLE BETTER THAN COMMON HOSS SENSE. I WAS IN SUCH A HURRY THIS MORNING I FERGOT TO FEED 'ER, AND BY GOLLIE! SHE'S TRYIN TO CALL ME UP. HAW! HAW! HAW! RONEY, OLD GIRL, YOU'R THE SMARTEST HOSS IN THIS HERE TOWN.
FAIR
SEP 4
Brandenburg

Emory Angel, lineman for the Public Service Phone Co., now claims that the company's horse, "Roney," has more real good sense than a lot of people. Emory has a test telephone in the barn and the other morning the switchboard drop at central went down on this test phone. Emory answered the call, but got no reply to his repeated "hello." Finally he went to the barn to see what the trouble was and found "Roney" rubbing her nose up and down on the switch hook. Emory had been busy that morning and had neglected to feed the animal and he now swears "Roney" was calling for her breakfast.—Leesburg (Ind.) Journal.

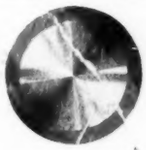
"Service," said Uncle Abner, "means wearing 'em shiny on one side and then turning 'em inside out."

That's Copper Clad too, twice the life and twice the strength of copper.

No. 12 B & S Copper Clad, 40 per cent conductivity costs only $16.00 per mile, and is more reliable mechanically than No. 9 B&S copper which would cost you $38.91.

That's why we have doubled the capacity of our mill.

TRADE MARK



"WELD-CLAD"

Duplex Metals Company
Chester, Pennsylvania

CHICAGO OFFICE
853 Peoples Gas Bldg.

NEW YORK OFFICE
30 Church St.

16,000

WARNER POLE CHANGERS

ARE IMPROVING RINGING SERVICE IN ALL PARTS OF THE WORLD

Here are some reasons why; first successful pole changer made; original 250 sent on trial twelve years ago still in use. Every one firmly guaranteed satisfactory, practically indestructible. Simple construction requires no attention, no current drawn from dry cells except when ringing.

Closed circuit battery operates vibrator which gives steady movement and 6 to 8 months service on one charge.

Cheapest power on earth—less than 25 cents per month for each 100 subscribers. Ask any Warner owner for many other reasons, or write us.

WARNER ELECTRIC CO., MUNCIE, IND.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

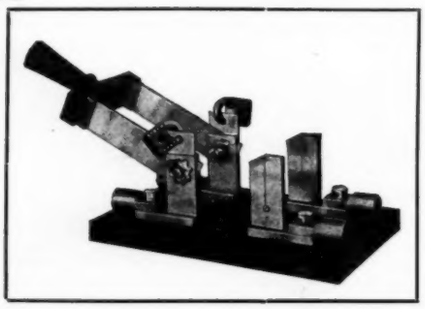
(*Continued from page 85.*)

Since the introduction of copper clad wire, careful tests, both in laboratories and in actual service, have been made. The information derived from these tests has been carefully tabulated and with the various factors upon which telephone transmission depends, can be found in a very interesting handbook just issued by the Duplex Metals Co., of Chester, Pennsylvania.

This hand book is of great interest to telephone and telegraph men, as it contains much useful and valuable information about a wire which has so rapidly come into favor as an electrical conductor.

Safety Lock Switches.

The Crouse-Hinds Co. has placed on the market a complete line of safety lock switches. Their use on electrically driven machinery, it is claimed, makes impossible such accidents to



The Safety Lock Switch.

repair men and machines as frequently result from the power being turned on at wrong times.

These switches are the regular Crouse-Hinds type "B" switches with the addition that one clip of each hinge standard of a two-pole switch and a clip of each outer hinge standard of a switch having three or four poles, are extra high and pierced with a 3/8-in. hole, centering 1⅛ in. below the top of clip, to receive the bow of a padlock.

Provision is made for two locks, one for the machinist and one for the electrical repair man. The man about to work on the machine or motor opens the switch, snaps on the padlock and, with the key in his pocket, proceeds with his labor. If the machinist and electrician are at work at the same time, each, because of his separate lock, is fully protected, and the switch cannot be closed until both locks are off.

Book Reviews.

A PRIMER OF SCIENTIFIC MANAGEMENT. By Frank B. Gilbreth; D. Van Nostrand Co., New York, publishers. 108 pages. Price, $1.

At the present time considerable interest is being taken in increasing the efficiency of employes in all lines of work. In the spring of 1911 a series of articles was published in the American Magazine under the title of "The Principles of Scientific Management," by F. W. Taylor. These articles attracted considerable attention and hundreds of letters were received asking for more information on various points. These letters were given to Mr. Gilbreth to answer and are embodied in this book. In it are given definitions of scientific management and the laws or principles which are applied. The effect of scientific methods upon the worker is discussed. For those who desire to obtain a clear idea of the principles, scope and application of scientific management, this book will be an efficient aid.

ELECTRICAL INJURIES, THEIR CAUSATION, PREVENTION AND TREATMENT. By Chas. A. Lauffer; John Wiley & Sons, New York, publishers. Flexible cloth cover, 4 inches by 6½ inches, 77 pages. Price, 50 cents.

Electrical men are now greatly interested in precautions leading to prevention of accidents and the methods for rendering effectual aid before the arrival of a doctor. This book contains information covering not only the treatment of electrical injuries, but also a comprehensive discussion of their causation and prevention. It is designed for the use of practical electrical men. The author is the medical director of the relief department of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. It first deals in the various electrical injuries that may arise; then follow notes on minor surgery and first aid. The last two discussions on infections and the effects of occupation on the health are particularly to the point. A list of questions on the subject matter makes the book a valuable one for student readers, and serves to discover many less evident merits of the text. The purpose of the author and publishers is evidently to offer the book at such a moderate price that it will be accessible to all.

Paragraphs.

FOOL'S GOLD is the striking heading of a folder issued by the Duplex Metals Co., Chester, Pennsylvania. It directs attention to the superiority of copper clad wire. The well-known trade of Copper Clad appears on every shipping tag and every foot of the wire is guaranteed.

THE RUBY CHEMICAL CO., formerly located at Johnstown, Ohio, has secured new quarters at 157 W. State street, Columbus, Ohio, which will be the company's address after this date. The Ruby Chemical Co. manufactures a soldering flux which is applied with a tube and brush. Its proposition has prospered very substantially within the past couple of years, and the company bids fair to continue its success in the future.

THE GRAY TELEPHONE PAY STATION CO., at Hartford, Conn., has published a new 152 page catalog, supplemental to the regular edition which last year exceeded 50,000 copies. In this new catalog, will be found among other features, a full description and attractive illustration of the new multi-coin, prepayment station, of which 25,000 now are being installed in New York and Chicago. The patent situation relating to the pay station proposition also is fully discussed in the new catalog, which will be sent on request to all interested parties.

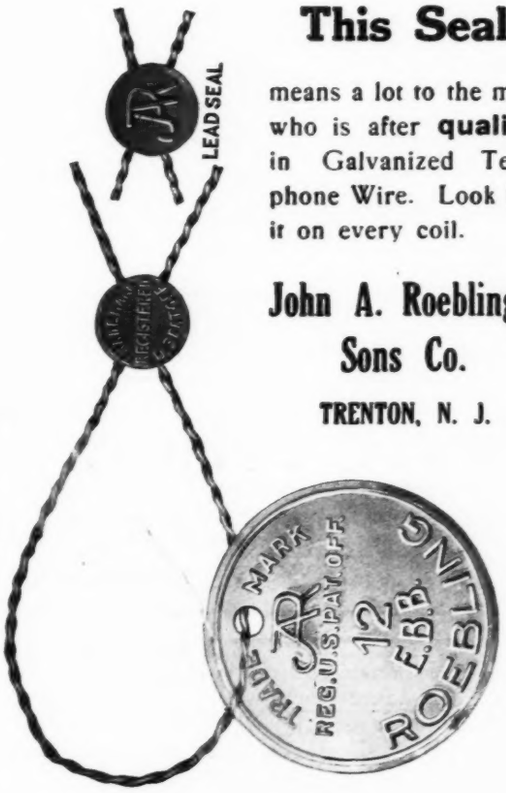
JOHN W. COFFEY, of the Coffey System & Audit Co., of Indianapolis, reports that he is at present installing his accounting system for the Logansport Home Telephone Co., of Logansport, Ind. His recent installation at Dyersville, Iowa, mentioned in these columns, is giving perfect satisfaction. Mr. Coffey states that the system there covers the operations of twenty-four exchanges, all the accounts passing through one office, all being handled by one lady bookkeeper.

The new address of the company in Indianapolis is Suite 501-502 K. of P. Building, to which all inquiries should now be addressed.

Automatic Electric Company's British Installation.

In the latter part of May, the Automatic Electric Co. of Chicago completed the installation and cut-over was made of a 500-line, full automatic system for the British government at Epsom, England, which has since been in operation. This installation was made for the British government post office department, under whose jurisdiction the telephone system of Great Britain is now operated. Four engineers of the British government recently spent more than four months investigating general telephone conditions and all types of apparatus in the United States.

(*Continued on page 46.*)



This Seal

means a lot to the man who is after **quality** in Galvanized Telephone Wire. Look for it on every coil.

John A. Roebling's Sons Co.

TRENTON, N. J.

TELEPHONE WIRE

We Guarantee
Greatest Efficiency
Longest Life
Most Satisfactory Service
Lowest Cost of Up-keep
In the Use of our wire.

Write for FREE SAMPLE
Make Test and Comparison

Approved by Leading Institutions of Technology and Telephonic Science. Handled by most representative Jobbers and Supply Houses.

Indiana Steel & Wire Co.
Muncie, Indiana.

W&M TELEPHONE WIRE

OUR W. & M. Telephone Wire is drawn from metal made especially for the purpose and rigidly inspected. The spelter is carefully laid on with uniform thickness, ensuring ample protection for the wire under extreme weather conditions.

In point of conductivity this good wire has attained the highest possibilities and we submit our three brands—"E. B. B." "B. B." and "Steel"—as the best that can be produced.

"W. & M. Telephone Wire News," a publication describing telephone wire in practical use, furnished free upon application.

We Make

American Wire Rope
Aeroplane Wire and Strand
Piano Wire
Mattress Wire
Weaving Wire
Broom Wire
Fence Wire
Flat Wire
Flat Cold Rolled Steel
Wire Hoops
Electrical Wires and Cables
Rail Bonds
Bale Ties, Tacks, Nails, Staples, Spikes
Barbed Wire
Woven Wire Fencing
Fence Gates
Steel Fence Posts
Concrete Reinforcement
Springs
Sulphate of Iron
Poultry Netting
Wire Rods
Juniata Horse Shoes and Calks
Shafting Cold Drawn Steel
Wire of Every Description

We issue separate catalog for each of these. Gladly furnished upon application.

American Steel & Wire Co.'s Sales Offices

CHICAGO 72 West Adams Street
NEW YORK 30 Church Street
WORCESTER 94 Grove Street
BOSTON 120 Franklin Street
PITTSBURG Frick Building
CINCINNATI Union Trust Building
CLEVELAND Western Reserve Bldg.
DETROIT Ford Building
ST. LOUIS Third Nat'l Bank Bldg.
ROSTREAL Bank of Ottawa Bldg.
ST. PAUL-MINNEAPOLIS Pioneer Building, St. Paul
DENVER First Nat'l Bank Bldg.
SALT LAKE CITY 736 South 3rd West Street
SAN FRANCISCO 16th & Folsom Sts.
PORTLAND Sixth & Irving Sts.
SEATTLE 4th Ave., S. & Conn. St.
LOS ANGELES Jackson & Central Avenues
NEW YORK United States Steel Products Co., 30 Church St.
Export Representatives

Samuel G. McMeen **McMeen & Miller** Kempster B. Miller
ENGINEERS EXPERTS
Telephony Telegraphy Signaling Lighting Power
Plans Estimates Supervision Consultation Investigations Development of Inventions
Appraisals and Rate Investigations of Public Utilities
1454 Monadnock Block CHICAGO

FRANCIS W. DUNBAR
PATENT EXPERT
EXPERT
ELECTRICAL ENGINEER
CONSULTING ENGINEER
MONADNOCK BLOCK CHICAGO, ILLS.

D. C. & WM. B. JACKSON
CHICAGO Harris Trust Bldg. ENGINEERS BOSTON 84 State Street
Plans, Specifications, Supervision of Construction
General Superintendence and Management
Examinations and Reports
Financial Investigations and Rate Adjustments

EDWARD E. CLEMENT
Attorney at Law
Practice includes representation before the Interstate Commerce Commission
SOLICITOR OF PATENTS
OFFICE: McLACHLEN BUILDING, WASHINGTON, D. C.

WM. J. LANSLEY
Consulting Civil and Electrical Engineer
Telephone and lighting plants designed and remodeled.
Reports on telephone and lighting properties.
Tests of street lighting systems.
TELEPHONE BUILDING PERTH AMBOY, N. J.

Let us rehabilitate your Telephone Property for you, Physically and Financially
JONES & WINTER
1259 Monadnock Block - - CHICAGO

That idea that works so well in your exchange may be converted into A Profitable Invention. Many years of experience enables us to judge.
We have fully equipped shops and laboratory; we perfect inventions, make models, secure patents.
H. R. Van Deventer, E. E. Solicitor of Patents SUMTER, S. C R. M. Warren, M. E. Mechanical Expert

(*Continued from page 44.*)

This installation was made as a result of this investigation.

A further installation of 400 lines of automatic apparatus manufactured by the Automatic Electric Co. was installed in the general government buildings in London and the cut-over was made this month. The equipment of these exchanges contains many special features necessary to meet conditions in England, including pay station service, measured service, zone service, etc.

The automatic installation at Epsom particularly was watched with great interest not alone by the British government officials, but by the British public as well.

The English papers are devoting a great deal of attention to the subject; the comment of the British press generally is very complimentary.

The following is an extract from the London Daily Mail of May 31, 1912, under the heading: "No More Wrong Calls —Success of the Automatic Telephone":

"Though the automatic telephone has only been working at Epsom a short time, the inhabitants of the town are loud in their praises of the new system. It enables them almost instantly to get any number they require by simply turning a pointer on a numbered disc.

"The following replies have been received to inquiries made by the Daily Mail, of Epsom telephone subscribers whose numbers were taken haphazard from the telephone directory:

"375 Epsom—Quicker service. Never get wrong numbers. No trouble about engaged signals.

"60 Epsom—Far better service. Get connected almost instantly as compared with endless trouble on the old system.

"327 Epsom—Marvelously successful in local area. Outside local area a little difficult, but will get used to it in time. Cannot speak too highly of the automatic telephone.

"258 Epsom—Perfectly successful. There is an entire absence of complications or trouble. Connections instantly, as compared with previous long delays. No difficulty about connections with outside districts. System exceedingly simple.

"309 Epsom—System much more satisfactory; get numbers good deal quicker."

The London Herald of May 25 says:

"Local subscribers are so far highly satisfied with the automatic telephone system, and their week's experience of it has caused them to form a decided opinion that the new system is a great improvement on the old one, especially for local calls."

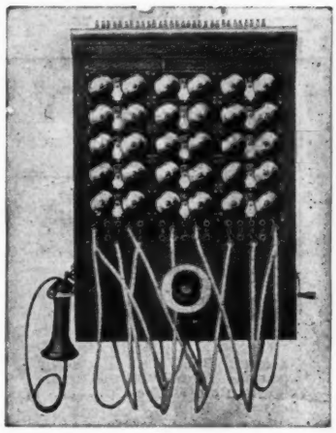
The following is from the Evening Standard and St. James Gazette of May 18, 1912: "Automatic Telephones—Interesting Experiment at Epsom Today:"

"The first experiment with automatic telephone at Epsom was carried out here today. At three o'clock punctually, 320 telephone subscribers were rung up from the exchange and requested to shift a switch which had been temporarily fixed to their telephone instruments.

"This was the signal given to subscribers to inform them that in future they could dispense with the services of the telephone girl and make their calls automatically.

"Three hundred and twenty subscribers, anxious to test the efficacy of the new system, called up the Central Exchange and their friends, by inserting a finger in the hole of a revolving dial, and turning it around until they had covered all the figures of the required number.

"So far there has not been a single complaint, but in order to test the system outside the Epsom area, I turned the dial round on figures 1 and 5 (15 being the number of the City area) and immediately got into communication



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with an operator in London, and gave in my number. "An official of the Automatic Telephone Manufacturing Co. informed me that the only disadvantage connected with the system will be with subscribers themselves, who may not at first be able to manipulate the dial, but a little care on their part will soon do away with any difficulty at first experienced.

"As for the cost, the initial expense of the new system is slightly higher than the old one, but the annual charges are lower."

Estimates are now being made by the Automatic Electric Co. for the British Government for Leeds, a city of 450,000 population, and Portsmouth, having 230,000 population.

A New Ericsson Agent.

The Ericsson Mfg. Co., makers of the well-known Ericsson apparatus, including the famous Handmike and the Ericsson breastplate transmitter (Handmike's Pretty Sister), has appointed as its agents in Virginia and North and South Carolina, the Tower-Binford Electric & Mfg. Co. of Richmond, Va.

The Tower-Binford company is very well known all through this territory and has earned a splendid reputation in the long period of years during which it has served the electrical trade in the Atlantic Coast states, well and faithfully.

The combination of Ericsson apparatus, with its undeniable reputation for quality, and Tower-Binford Electric & Mfg. Co., with its equally undeniable reputation for fair dealing and for handling only the best quality of apparatus of all kinds, will certainly make a winning team. We wish them good luck and want to congratulate all the telephone companies in that section of the country on this arrangement which, it is believed, will be greatly to the advantage of all concerned and not the least, by any means, to the advantage of the operating telephone manager.

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